AUTOMOTIVE INDUSTRIES

AUTOMOTIVE and AVIATION MANUFACTURING
ENGINEERING • PRODUCTION • MANAGEMENT

JANUARY 15, 1958

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Special Machines for Chevrolet Rear Axles
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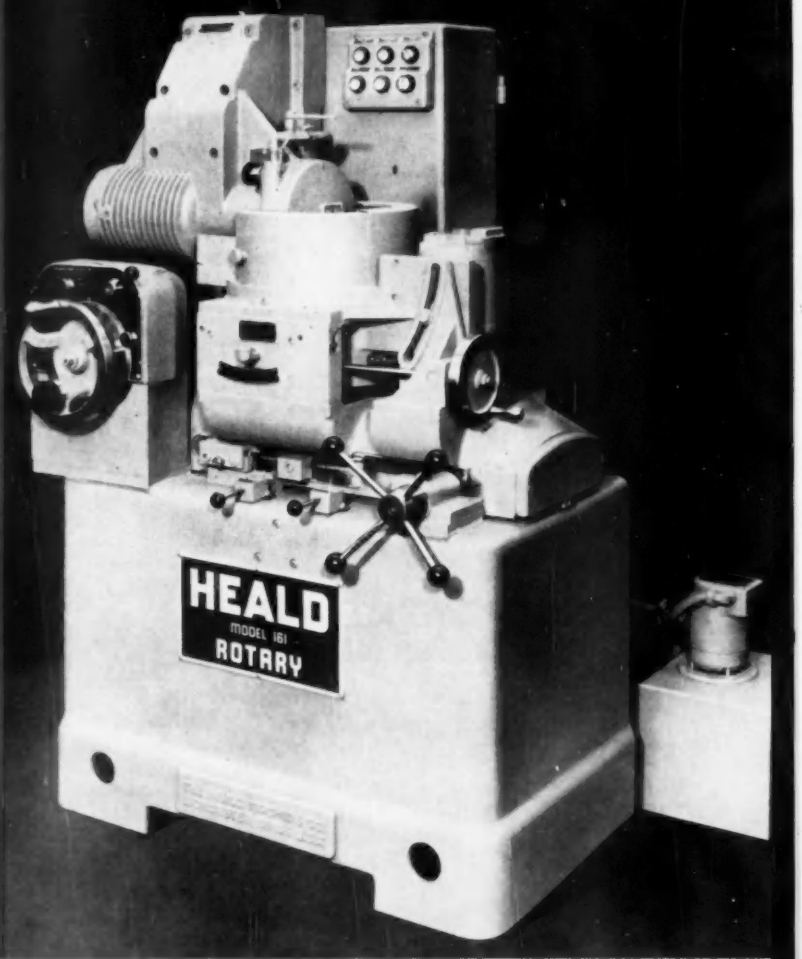
A CHILTON PUBLICATION

There's a NEW LOOK and NEW PERFORMANCE in this 1958 Model!



Here's what the new Model 161 Rotary can do for you...

Greater Precision — Dial knob type feed box now permits incremented feeds of .0001 from 0 to .0006 for rough grinding, changing automatically to .0001 fine feed at any point from 0 to .005 before finish size.

Finer Finish — Rugged cradle-type chuck bracket and swivel adjustment minimizes chatter. And vibration-free diamond unit gives wheel a smoother dress.

Easier Operation — Anti-friction table ways give easier manual reciprocation. Four ounce pressure moves the 590 lb. table.

Higher Production — Hydraulic table feed rates infinitely variable from 0 to 10 fpm. Permits smooth slow dressing speed, changeable instantly to rapid traverse or reciprocating speed.

Greater Versatility — A manually operated machine is easily changed over to hydraulic operation simply by adding a power pack.

Less Maintenance — Anti-friction table and base ways are grease packed for life and sealed to exclude foreign matter. Hydraulic table design minimizes spare parts inventory and reduces maintenance and attention.

The 1958 Model 161 Rotary Surface Grinder is ideally suited to all small work grinding operations, on a high production or job-lot basis. Grinds flat, convex or concave surfaces of work up to 6 in. O.D. For complete information, send today for Bulletin 2-161-2 Issue 1.

IT PAYS TO COME TO HEALD!

THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York

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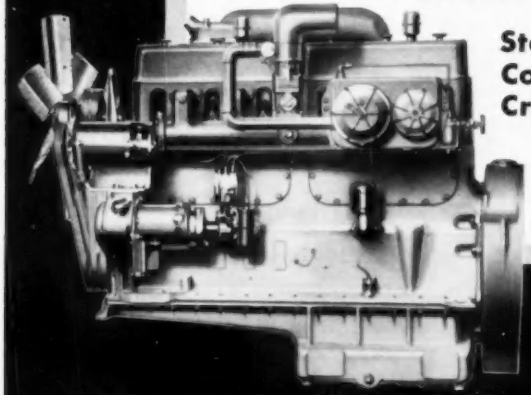
OFF THE HIGHWAY...

...or over the road

WAUKESHA ENGINES

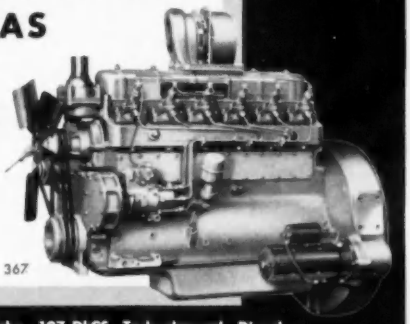
NORMAL and TURBOCHARGED DIESELS ...GASOLINE...LP GAS



Waukesha WAKB—Equipped for Butane—6-cylinder, 6¼ x 6½-in., 1197 cu. in., 300 max. hp @ 1800 rpm.

Standard or Counterbalanced Crankshafts

Write for descriptive bulletins



Waukesha 197-DLCS Turbocharged Diesel (also normally aspirated)—6-cylinder, 4 x 4-in., 302 cu. in., 131 max. hp @ 2800 rpm.

367

WAUKESHA MOTOR COMPANY

Waukesha, Wisconsin • New York • Tulsa • Los Angeles

Smooth I. D. Tubing Simplifies Production of Hydraulic Cylinders

Machining and fabricating operations can be reduced or eliminated if tubing used in hydraulic cylinders has as near perfect a surface and as close size tolerances as commercially possible. To achieve these desired qualities, checking and rechecking are integral parts of the tube making operations.

For checking the tolerances of the special smooth I.D. of welded carbon steel mechanical tubing which is to be used for hydraulic cylinders, Walter Pilmer —one of the inspection crew at B&W's Alliance, Ohio, plant—is using a sensitive precision measuring instrument called a bore gage. This is only one of the many checks of the tube production cycle.

Years of experience and the most advanced equipment available anywhere result in B&W "special smooth I.D." mechanical tubing. This tubing is provided with a guaranteed maximum average micro-inch finish on the I.D. which makes it ready for use in many hydraulic systems on delivery. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

TA 7050-G4

B&W TUBULAR PRODUCTS DIVISION

Seamless and welded tubular products, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels

AUTOMOTIVE INDUSTRIES

A CHILTON MAGAZINE — PUBLISHED SEMI-MONTHLY

JANUARY 15, 1958 — VOL. 118, NO. 2

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PIONEER ALUMINUM INC.

announces new

921-T DC

UNIVERSALLY ACCEPTED FOR PRECISION LOW COST TOOL ENGINEERING IN ALL METAL WORKING INDUSTRIES

Direct Chilled 921-T Machined Aluminum Tooling Plate is here, in sizes up to 60 inches wide, 192 inches long and 12 inches thick. Made exclusively by Pioneer Aluminum Inc., the new material is manufactured under processes which control solidification and provide greater density, less porosity and higher mechanical properties to augment the characteristics of standard 921-T.

Pioneer 921-T Machined Aluminum Tooling Plate meets every precision tooling requirement, and at lower cost. Its extreme stability, wide versatility and easy workability effect great savings in tool and jig fabrication. It can be machined at high speed. It is light to handle, and is easily sawed, drilled, tapped, milled or welded. All 921-T plate ¾" thick and over, is guaranteed flat within .010". Insure better, more stable jigs and fixtures; faster and at less cost, by calling out Pioneer 921-T or 921-T-DC.

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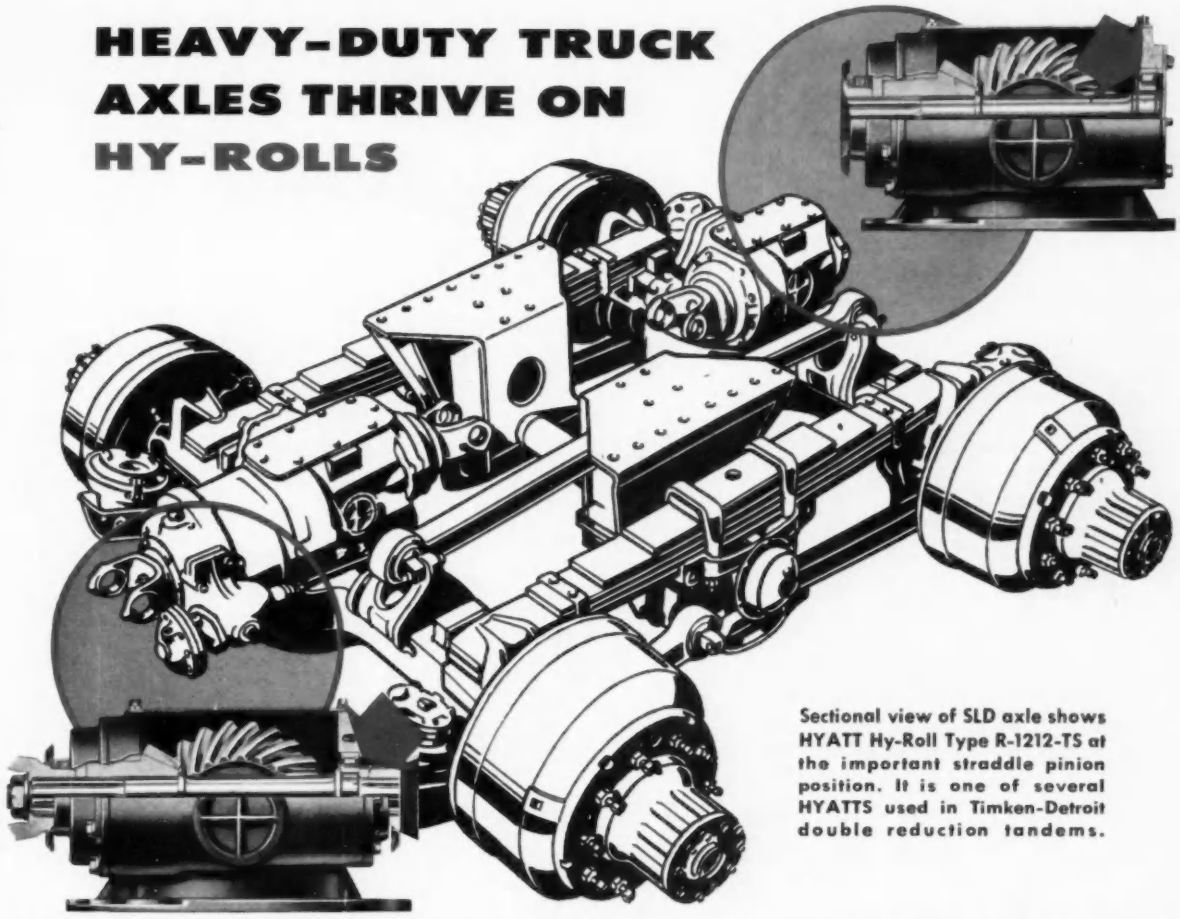
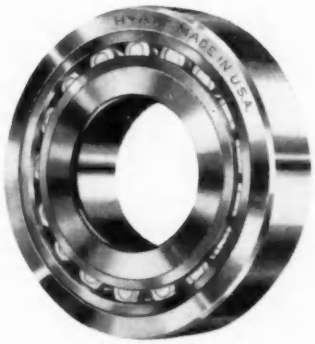
HEAVY-DUTY TRUCK AXLES THRIVE ON HY-ROLLS



Sectional view of SLD axle shows HYATT Hy-Roll Type R-1212-TS at the important straddle pinion position. It is one of several HYATTS used in Timken-Detroit double reduction tandems.

TIMKEN-DETROIT SPECIFIES HYATT HY-ROLL BEARINGS FOR SLD, SLDD TANDEM AXLES



These rugged Timken-Detroit top mounted tandems, with straight line drive through double reduction gears, are earning a reputation for dependability and parts interchangeability which keeps downtime and maintenance costs very low.

Typical of the top-quality components that go into these axles are HYATT cylindrical roller bearings, chosen for their ability to carry extremely heavy radial loads without restricting lateral movement, and their ease of assembly and disassembly. Timken-Detroit Division of Rockwell Spring and Axle Company, like other leaders in the industry, depends on HYATT engineering and production know-how for the *best* in bearings. So can you! Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey; Detroit; Chicago; Pittsburgh; Oakland, California.

THESE LEADING COMPONENT MANUFACTURERS ALL USE HYATT BEARINGS:

★ CLARK EQUIPMENT COMPANY (transmissions and axles)

★ DANA CORPORATION (Spicer transmissions)

★ EATON MANUFACTURING COMPANY (axles)

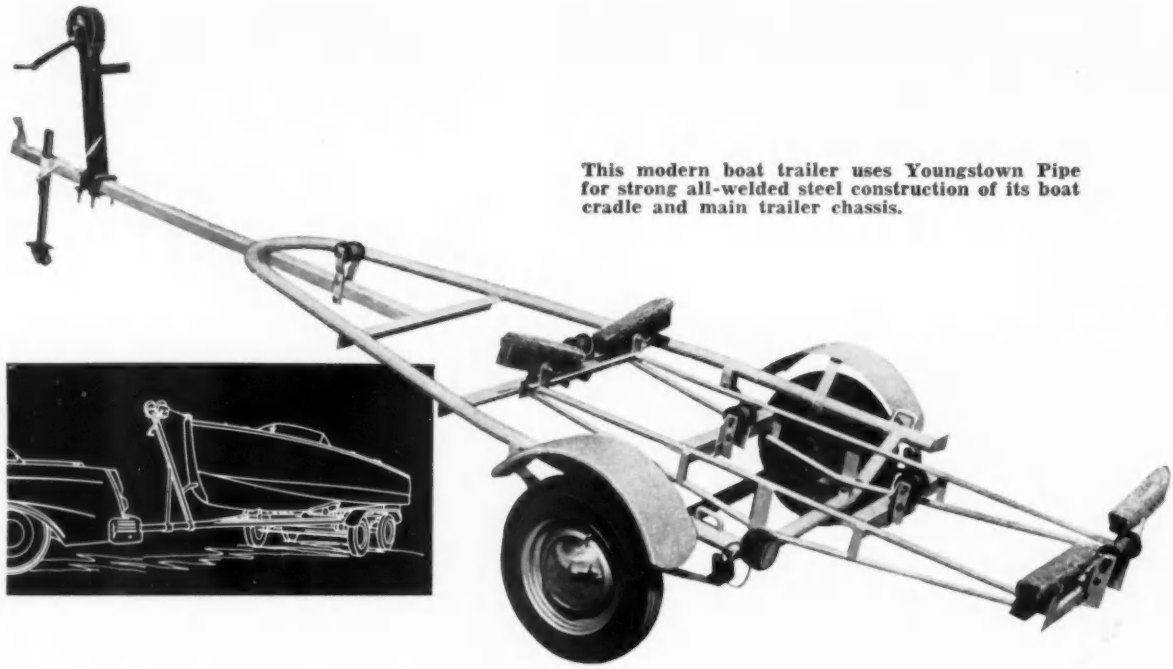
★ FULLER MANUFACTURING COMPANY (transmissions)

★ ROCKWELL SPRING AND AXLE COMPANY (Timken-Detroit axles)

THE RECOGNIZED LEADER IN CYLINDRICAL BEARINGS

1908–1958 GM FORWARD FROM FIFTY

HYATT HY-ROLL BEARINGS FOR CARS AND TRUCKS



This modern boat trailer uses Youngstown Pipe for strong all-welded steel construction of its boat cradle and main trailer chassis.

YOUNGSTOWN CONTINUOUS WELD PIPE

. . . provides extra-strength chassis for "Texan" boat trailers

Here's an unusual application for steel pipe. "Texan" Boat Trailers, produced by the Cunningham Trailer Works of Lubbock, Texas, are fabricated from Youngstown Pipe to provide users maximum cargo protection as well as greatest ease during loading, unloading and while making the haul.

In line with Cunningham's policy of using only the highest quality raw materials, they wisely specify Youngstown Continuous Weld Pipe for fabrication of both the boat cradle and main trailer chassis. This gives Texan boat trailers a sturdy welded steel construction able to withstand the most rugged use—on or off the highway. Why not use Youngstown Pipe structurally to build strength and quality into your products?

Your local Youngstown Distributor is the man to call when you want quality pipe—day or night. He has a complete stock and his on-the-spot fast delivery will help keep your operations humming along at top speed. Why not call him today?

Next time you need pipe—for any purpose — specify Youngstown and secure these 7 Points of uniform goodness

uniform ductility
uniform lengths
uniform threading
uniform weldability
uniform wall thickness and size
uniform strength and toughness
uniform roundness and straightness

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Manufacturers of Carbon, Alloy and Yoloy Steel
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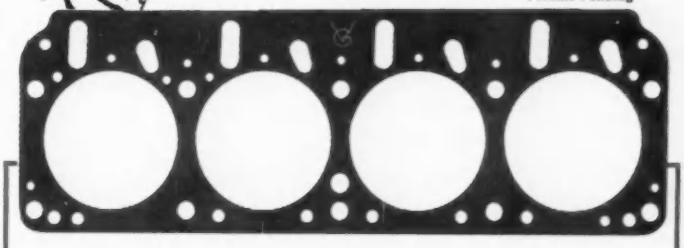
So thin and flexible — handles like fabric

TRADE-MARK (Registration Applied for)

new gasket . . . strong and thin

LOCKS all the power in

Patents Pending



For High Compression Engines

Tested on thousands of engines in the past year, **Victocor** is setting new standards for high-compression sealing. It insures maintenance of original compression ratio and maximum power production. It outperforms all other gaskets.

Completely new in concept, **Victocor** is thin and "soft" . . . flat and flexible. It uses no beading, grommets or flanges. It combines the resilience of rubber . . . the heat resistance of asbestos . . . the strength of steel. It handles as easily as fabric.

Fast Heat Transfer, the Secret

Exclusive thin steel core construction highly accelerates **Victocor's** heat conductivity. It's done with projections from the core, formed alternately on each face. Type 200, for example, has 800 such projections per sq. in.

The sealing element—a special asbestos-elastomeric compound—is bonded simultaneously to core face. This structure prevents loss of torque due to collapsing and pounding under heavy load. It has dimensional stability. It positively retains all coolants.

Has Car Manufacturer Approval

Now in use as original equipment, **Victocor** head gaskets far exceed ordinary sealing requirements. Their extreme resiliency compensates for mating surface irregularities. They need no pre-coating on installation, yet come off without difficulty.

For trucks, tractors, diesel and fuel injection engine applications, equally efficient **Victocor** material will be announced shortly.

Victor Mfg. & Gasket Co., P.O. Box 1333, Chicago 90, Ill. In Canada: Victor Mfg. & Gasket Co. of Canada Ltd., St. Thomas, Ont.

Samples Free — 4 Types — Specification Non-Rigid

In four basic types, **Victocor** offers a new degree of balanced resilience and heat resistance. Any type can be modified to your application—in core or packing, gauge or structure. It's the **Victocor** construction that assures good performance.

Complete data on types, sizes, physical properties—also test samples—sent on request. And Victor Engineers will be glad to work with you, without obligation.

VICTOR

Sealing Products *Exclusively*

GASKETS · OIL SEALS · PACKINGS · MECHANICAL SEALS

8-year accelerated tests at HARVEY ALUMINUM prove LaSalle STRESSPROOF® and FATIGUE-PROOF® better than heat treated steel of even higher

...also cut costs by 25%

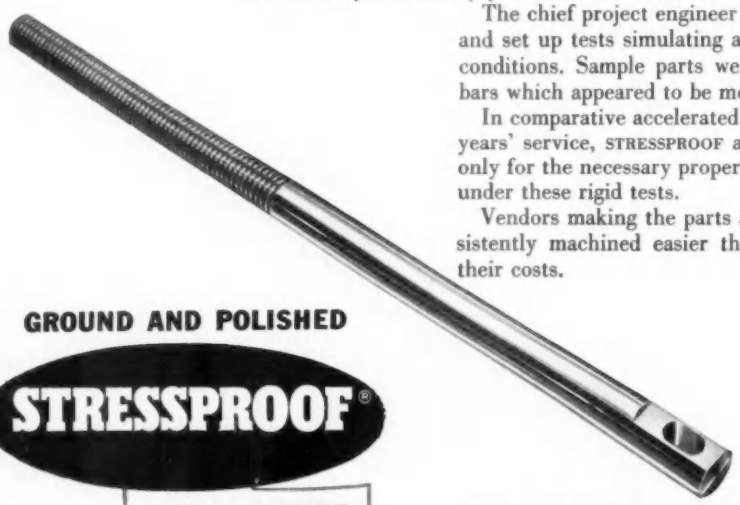
The design requirements of the new Harvey Aluminum Reduction Plant at The Dalles, Oregon, demanded the best available materials. Harvey is the largest independent fabricator of wrought aluminum mill products, and, *as a metallurgical concern, their manufacturing requirements go beyond ordinary interests.*

One of the vital components of the plant is the anode jack assembly. The assembly operates under a 60-ton load and under adverse conditions. Failures here cannot be tolerated because they would stop production and create a tough maintenance problem.

The chief project engineer knew he could not take chances . . . and set up tests simulating as nearly as possible actual operating conditions. Sample parts were made from those grades of steel bars which appeared to be most suitable.

In comparative accelerated tests, considered the equivalent of 8 years' service, STRESSPROOF and FATIGUE-PROOF were selected not only for the necessary properties but because they performed best under these rigid tests.

Vendors making the parts also found that these steel bars consistently machined easier than the heat treated steels and cut their costs.



GROUND AND POLISHED

STRESSPROOF®

WITH COPPER

PROVED BETTER THAN:

A-4140—Heat Treated Rc28-30

C-1040—Heat Treated Rc28-30

C-1144—Cold Drawn and Strain Relieved

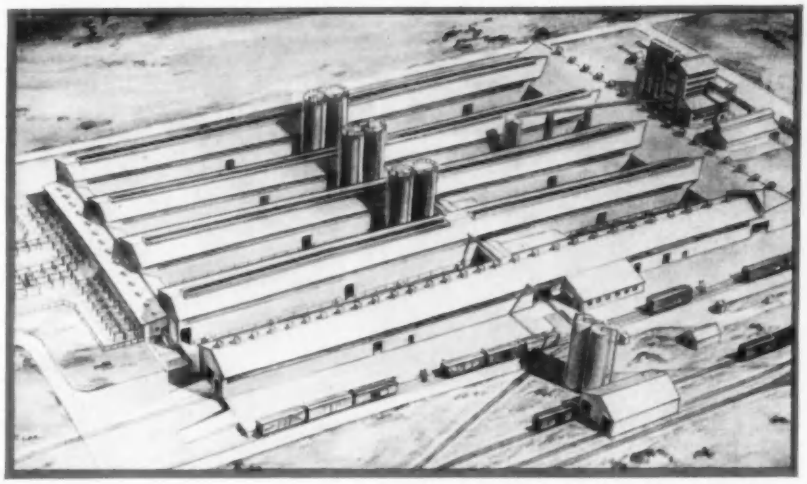
2,025 better shafts ...at 25% savings

TEST No. 1: After submitting sample shafts of each of the analyses shown at the left to the accelerated tests for wear, strength, and overload, STRESSPROOF anode shafts were proved superior. (1) STRESSPROOF gave consistent and faster machining. (2) STRESSPROOF shafts required no straightening. Other materials warped after machining. (3) STRESSPROOF showed excellent wear characteristics under applied load. (4) STRESSPROOF shafts were produced at a savings of 25% over the other materials tested.

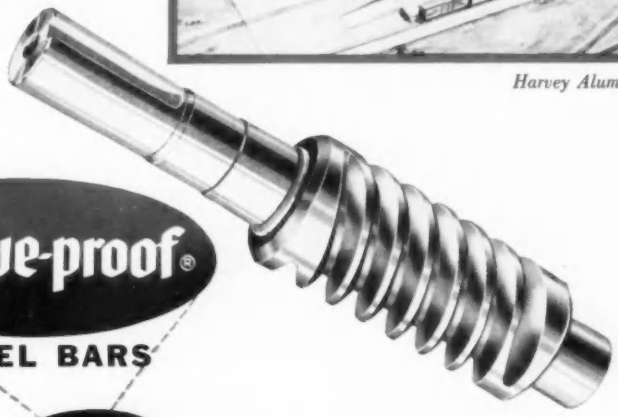
La Salle STEEL CO.

1438 150tn Street, Hammond, Indiana

steel bars
hardnesses



Harvey Aluminum Reduction Plant, The Dalles, Oregon.



fatigue-proof®
STEEL BARS

MADE BY **e.t.d.** PROCESS
Elevated Temperature Drawing

2,025 better worms ...at 25% savings

PROVED BETTER THAN:

A-4140—Heat Treated Rc35-38
A-4130—Heat Treated Rc35-38
A-5160—Heat Treated Rc35-38
C-1048—Heat Treated Rc38-40

TEST No. 2: Sample bars of each of the analyses listed at the left were also put through a test equivalent to 8 years' operation. After completion of tests, FATIGUE-PROOF steel showed excellent ability to work-harden and to withstand operating loads. Machinability was superior to the other grades tested and total cost of producing the worm gear was reduced by 25% with the use of FATIGUE-PROOF steel.

also available from your steel service center

LA SALLE STEEL CO.
1438 150th Street
Hammond, Indiana

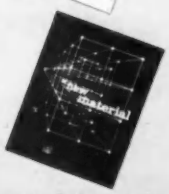
*name*_____

*company*_____

*address*_____

*city*_____ *state*_____

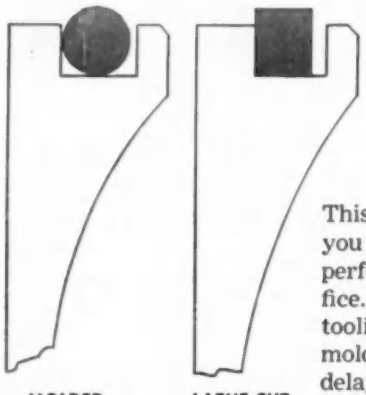
☐ Please send the newly published engineering report, "The Effect of Copper, Abnormally Heavy Drafts, Furnace Treatment and Die Practice on STRESSPROOF Steel Bars."



☐ Please send 24-page bulletin, "A New Material," which presents the results of more than one year's tests and reports on eight application case studies of La Salle FATIGUE-PROOF steel bars.

Why ACADIA LATHE-CUT SYNTHETIC RUBBER SEALS

can save you money in *STATIC* or *MOVING* seal applications



MOLDED O-RING SEAL

LATHE-CUT SEAL

This seal will save you money with no performance sacrifice. Minimum tooling cost, no molds, no costly delays. Can be made up to 25" I.D.

Acadia Synthetic Rubber Parts are of the highest quality components, processed for oil resistance, good aging properties, resistance to heat. They can be furnished in any dimension or special compound you desire to precision tolerances. They are another example of Acadia's ability to SAVE YOU MORE..SERVE YOU BETTER.

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ACADIA *Synthetic* **PRODUCTS**

DIVISION OF WESTERN FELT WORKS
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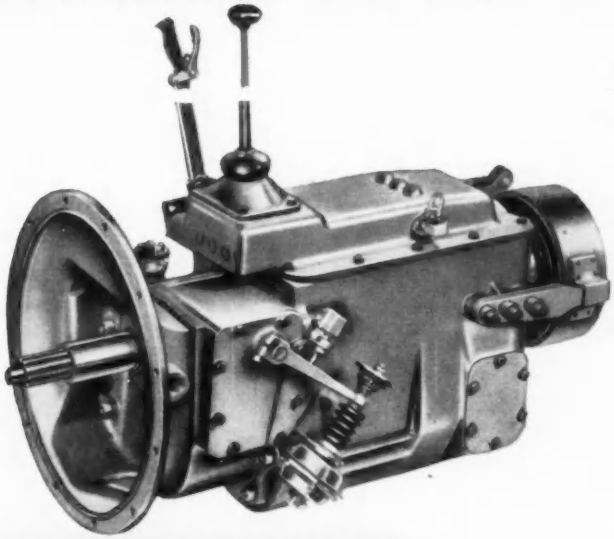
MANUFACTURERS AND CUTTERS OF WOOL FELT

Ideal for Highway Hauling-
CLARK stepMatic Transmission



Here's happy and profitable news for all operators whose truck equipment takes punishment—Clark's stepMatic Transmission. This transmission has proved particularly ideal for long-haul, high-speed operations.

- Ten speeds—splitting ratios in between the normal 5-speed transmission ratios—giving 28% steps to fit every hauling need.

Transmission gears synchronized. Semi-automatic shift for the splitting ratios

- Full control of gear-shifting at all times.
- Spares engine—the right ratio for every grade prevents engine lugging—decreases hauling time and fuel consumption.
- Increases transmission life—reduces shock loads. Less downtime for repairs.

By all means write for full information on this highway-proved achievement of Clark engineering.

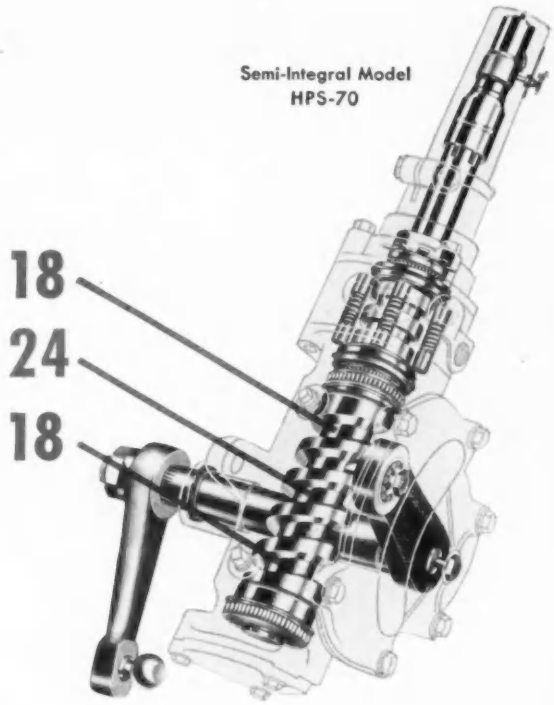
CLARK® EQUIPMENT

TRANSMISSION DIVISION
CLARK EQUIPMENT COMPANY
Falahee Road • Jackson 2, Michigan

ONLY Ross GIVES

VARIABLE-RATIO

POWER STEERING



faster for cornering . . . slower for straight-ahead

▶ **What's the advantage** of *variable-ratio* steering? For example . . . 18:24:18?

▶ **Variable-ratio** provides faster steering and quicker recovery for cornering, and slower steering and greater stability for high-speed, straight-ahead driving.

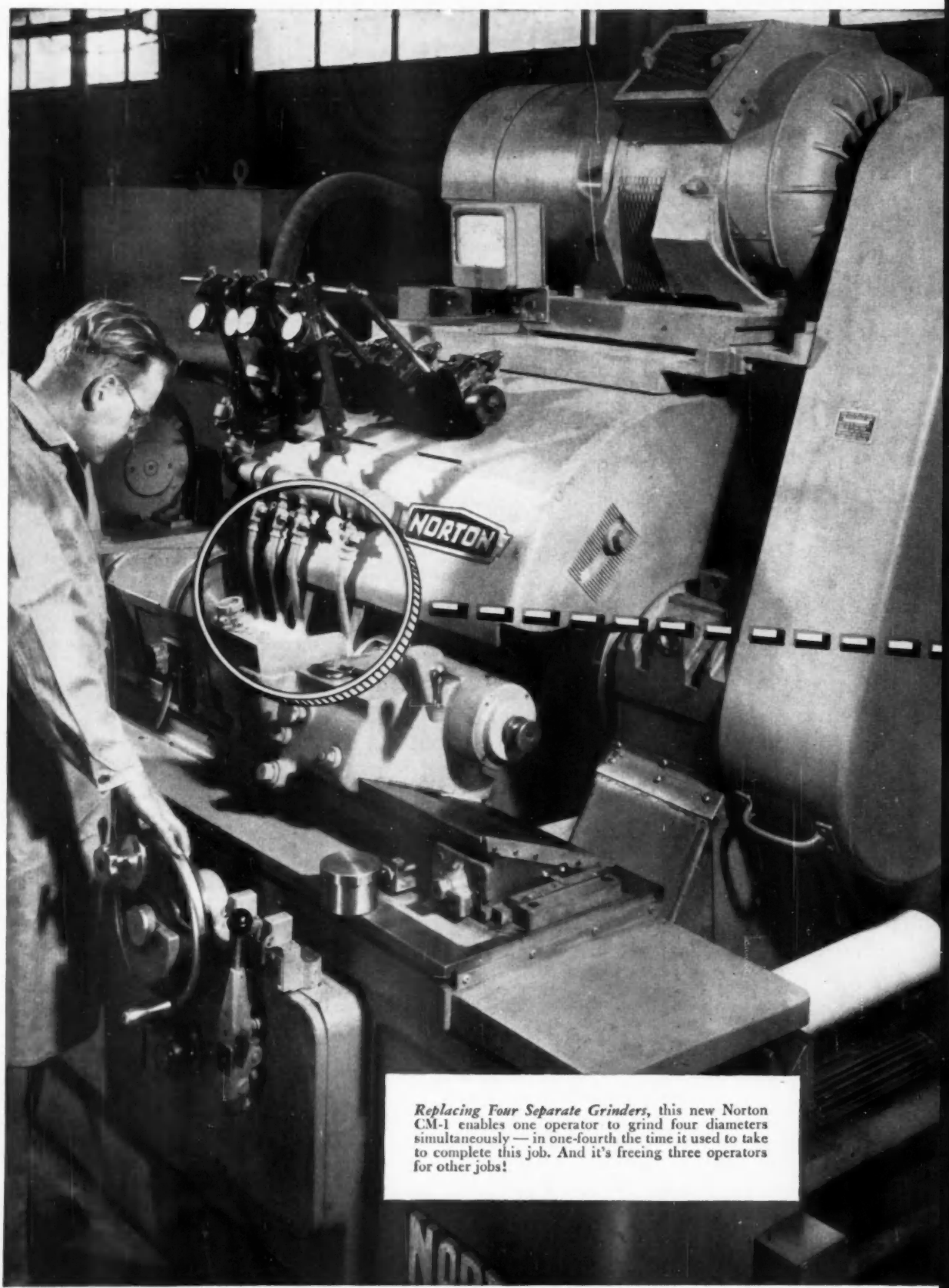
▶ **Variable-ratio** is an exclusive feature of Ross Hydrapower power steering and Ross Cam & Lever manual steering. No other type of steering gear provides it.

▶ **Ross makes all three** types of hydraulic power steering—integral, semi-integral and linkage—and invites discussion of *any* steering problem, power or manual, variable or fixed ratio.

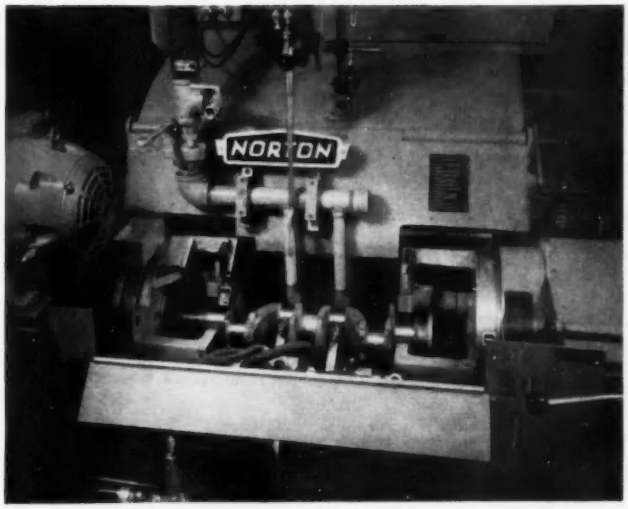
Ross **HYDRAPOWER**

ROSS GEAR & TOOL COMPANY, INC. · LAFAYETTE, INDIANA
Gemmer Division · Detroit

Aetna
BEARINGS and PRECISION PARTS
for Original Equipment Manufacturers
include
Standard and Special Ball Thrust Bearings • Angular Contact Ball Bearings • Radial Ball Bearing Mounted Units • Special Roller Bearings • Ball Retainers • Hardened and Ground Washers • Sleeves • Bushings • Special Components and Parts.
Precision parts production for original equipment manufacturers—as well as top quality anti-friction bearings—has been an important activity at Aetna since the inception of the company. A specialized staff of experienced engineers, metallurgists and production planning men analyze each problem to determine procedure, machines, methods and tests which will produce these parts better, faster, and more economically. Sizes up to 38" O. D. with deliveries which meet your production schedules.
Submit your bearing and parts problems for analysis and proposal.
Request new General Catalog and Engineering Manual
AETNA BALL AND ROLLER BEARING COMPANY
Division of Parkersburg-Aetna Corporation • 4600 Schubert Ave., Chicago 39, Ill.
IN DETROIT—SAM T. KELLER, 1212 FISHER BUILDING



Replacing Four Separate Grinders, this new Norton CM-1 enables one operator to grind four diameters simultaneously — in one-fourth the time it used to take to complete this job. And it's freeing three operators for other jobs!



A Great New Production Tool. The Norton Type CM-1 Heavy Duty Semi-automatic Multi-Wheel Grinder brings new efficiency and economy to the grinding of parts having multi-diameters—such as crank and camshafts, transmission and motor shafts, etc. Machine shown arranged for grinding two pins on automotive shaft. Machine is available also with power assist loading mechanism for certain jobs.

Here's a new Norton Grinder to

boost your production rate

400% or higher

Type CM-1 Heavy Duty Multi-Wheel Grinder does four or more jobs at once, reduces capital investment, cuts operating time and costs

When you can get one machine that does the work of several, in a fraction of the working time, you save considerably on purchase costs, on operating costs, and on floor space.

That machine is now ready to go to work for you. The new Norton CM-1 makes four or more cuts in a single plunge-grind cycle, operating automatically under one-lever control. And it completes each separate grinding operation with the accurate, trouble-free performance that's built into every Norton grinding machine.

Typical Advanced Features

- Cartridge type bearings at each end of heavy, 10″-diameter wheel spindle assure extreme rigidity of spindle, longer wheel life, greater accuracy and control with minimum truing.
- **Automatic truing device — in rear, out of operator's way — trues straight or formed wheels each individually, yet all at once, thus requiring only the amount of time needed to true widest wheel.**
- Automatic compensation for collective wheel wear, including amount trued off. No adjustment or resetting of wheel needed after truing.
- **Optional equipment includes built in automatic sludge remover and coolant filter, constant peripheral wheel speed control, increased power for wheel or work drive, etc.**

Why not get the complete story of how the CM-1 can benefit your grinding operations? See your Norton Representative, or write us direct. And remember: only Norton offers you such long experience in both grinding wheels and machines to bring you the "Touch of Gold" — to help you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass. *In Canada:* J. H. Ryder Machinery Co., Ltd., Toronto 5.

To Economize, Modernize With NEW

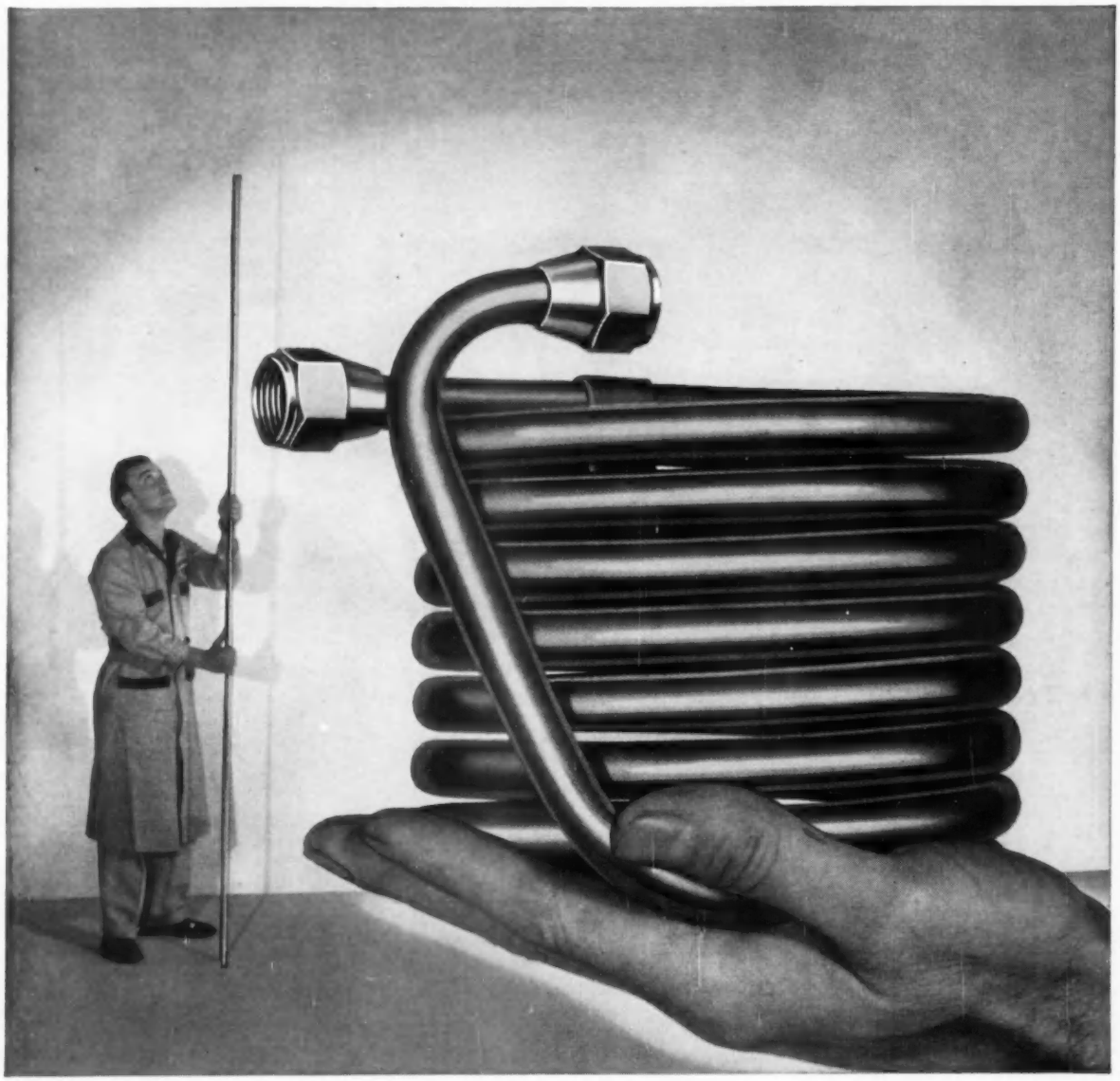
NORTON

GRINDERS and LAPPERS

Making better products... to make other products better

District Sales Offices: Hartford • New York • Cleveland • Chicago • Detroit

Over 11 feet of ductile Bundyweld



Oil cooler for power-steering unit stands only 4¾" high, yet contains over 11 feet of ½" x .035 Bundyweld Tubing. The inside diameter of the coil measures just 4.88". This I.D. dimension is held to +⅛" tolerance. Ends are double-flared with fittings attached.

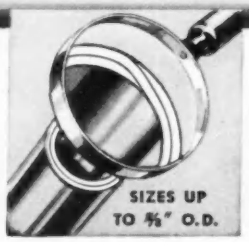
WHY BUNDYWELD IS BETTER TUBING

Bundyweld starts as a single strip of copper-coated steel. Then it's . . .

continuously rolled twice around laterally into a tube of uniformthickness,and

passed through a furnace. Copper coating fuses with steel. Result . . .

Bundyweld, doublewalled and brazed through 360° of wall contact.



←

NOTE the exclusive Bundy-developed beveled edges, which afford a smoother joint, absence of bead, and less chance for any leakage.

go into oil cooler just 4¾" high

Vital cooling coil for power-steering pump is precision-made with all fittings attached by Bundy's efficient fabrication facilities

This was the problem: cool the oil for a heavy-duty, hydraulic-power-steering pump; do it in limited space.

Working together, Eaton Manufacturing Company and Bundy® engineers found the answer: surround the hydraulic reservoir with a 4¾"-high cooling coil of Bundyweld® Tubing. Result: as hydraulic fluid is pumped through over 11 feet of tubing, its temperature drops 25° to 35°F.

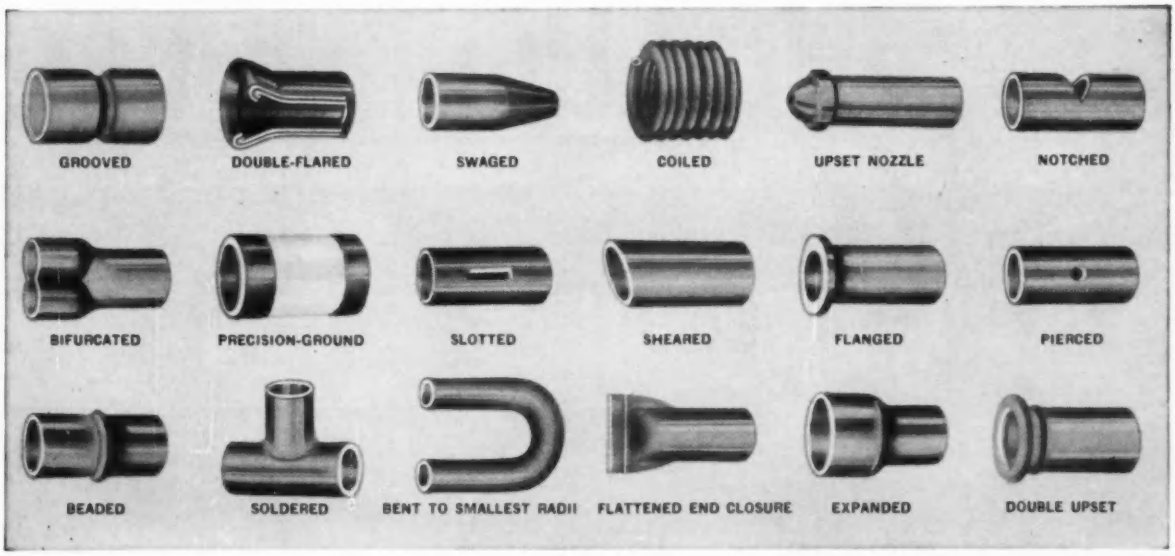
Bundy's skilled operators fabricate the oil cooler—assemble the fittings, double-flare the tubing ends, and coil the tubing. Tough fabrication jobs like this one look easy with highly versatile Bundyweld Tubing.

Made by the exclusive process shown below, left, Bundyweld has high tensile strength, bursting strength, and resistance to vibration fatigue . . . is smooth, ductile and easy to fabricate. Bundyweld is the safety standard of the automotive industry . . . *is used on 95% of today's cars, in an average of 20 applications each.*

If *you* need tubing for mechanical or fluid-transmission applications on cars, trucks or farm equipment, Bundy offers all this: free, expert engineering service; high-quality tubing in coils up to 2,000 feet . . . or fabricated to your specifications. You'll find it pays to contact Bundy *first*. Call, write or wire us today.

BUNDY TUBING COMPANY, DETROIT 14, MICHIGAN

WORLD'S LARGEST PRODUCER OF SMALL-DIAMETER TUBING • AFFILIATED PLANTS IN AUSTRALIA, ENGLAND, FRANCE, GERMANY, AND ITALY



Shown above are but a few of the fabrication operations which are possible with Bundyweld Steel Tubing. Many of these, and others not shown, were developed through solving a specific problem brought to us by our customers. Bundy invites *you* to take advantage of this design service at any stage in the development of your product.

THERE'S NO REAL SUBSTITUTE FOR

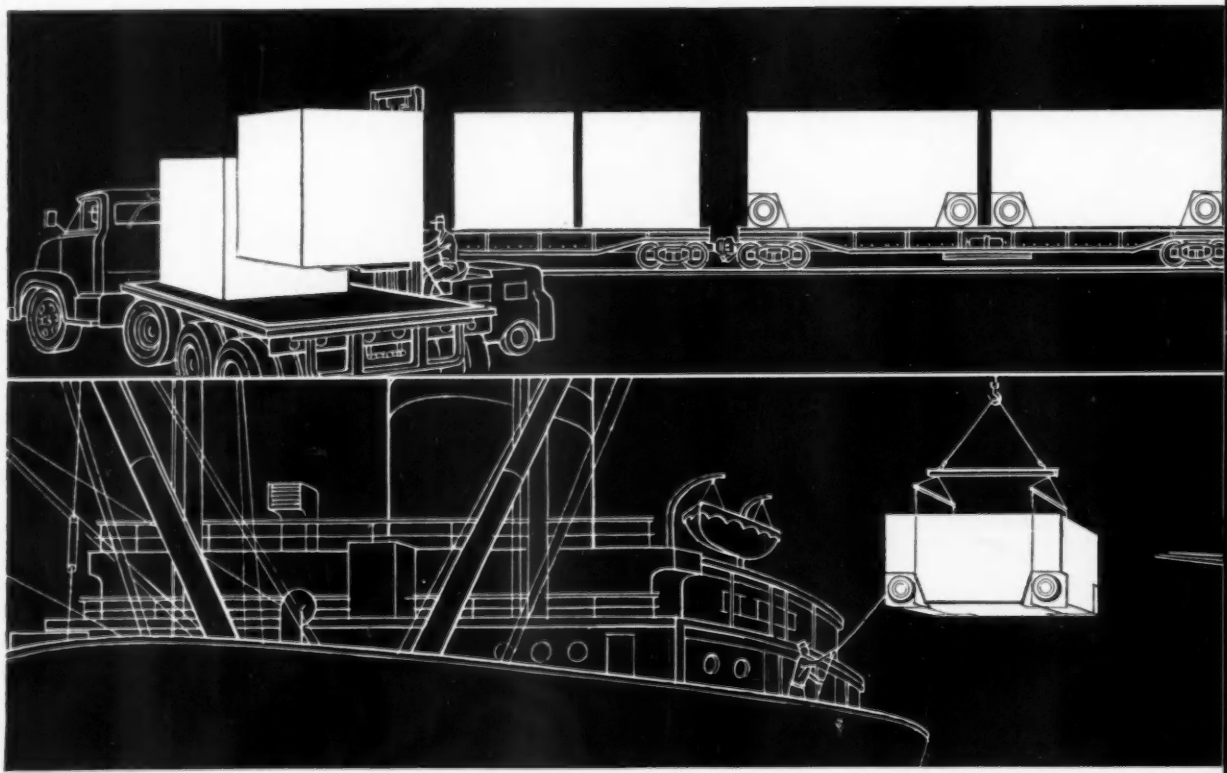
BUNDYWELD® TUBING

Bundy Tubing Distributors and Representatives: ***Massachusetts:*** Austin-Hastings Co., Inc., 226 Binney Street, Cambridge 42 • ***Pennsylvania:*** Rutan & Co., 1 Bala Ave., Bala-Cynwyd • ***Midwest:*** Lapham-Hickey Steel Corp., 3333 W. 47th Place, Chicago 32, Ill. • ***South:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg., Chattanooga 2, Tenn. • ***Southwest:*** Vinson Steel & Aluminum Co., 4606 Singleton Blvd., Dallas, Texas • ***Northwest:*** Eagle Metals Co., 4755 First Avenue, South, Seattle 4, Wash. • ***Far West:*** Pacific Metals Co., Ltd., 2187 S. Garfield, Los Angeles 22, Calif. • Pacific Metals Co., Ltd., 1900 Third Street, San Francisco 7, Calif.

Bundyweld nickel and Monel tubing are sold by distributors of nickel and nickel alloys in principal cities.

For whatever you *will* make . . .

N-A-X® HIGH-STRENGTH STEELS PROVIDE STRENGTH WITH LIGHT WEIGHT



Transportation today stands on the threshold of a major breakthrough . . . in the new direction of reduced handling for faster, easier distribution.

Piggyback is here to stay, so is "fishyback" and "birdyback." Sturdy, versatile steel containers move quickly and economically from flatcar to trailer—from ship to shore—even from ground to air.

Already N-A-X HIGH-STRENGTH steels are playing a leading role in this modern transportation trend. By providing the extra strength and corrosion resistance to assure long container life, plus light weight for economical handling and shipping, N-A-X HIGH-STRENGTH steels continue to accelerate transportation progress.

Check These Important Advantages for Your Job: N-A-X HIGH-STRENGTH steels—both N-A-X HIGH-TENSILE and N-A-X FINEGRAIN—compared with carbon steel, are 50% stronger • have high fatigue life with great toughness • are cold formed readily into difficult stampings • are stable against aging • have greater resistance to abrasion • are readily welded by any process • offer greater paint adhesion • polish to a high luster at minimum cost.

Although N-A-X FINEGRAIN's resistance to normal atmospheric corrosion is twice that of carbon steel, N-A-X HIGH-TENSILE is recommended where resistance to extreme atmospheric corrosion is important.

For whatever you make, from steel boxes to boxcars, with N-A-X HIGH-STRENGTH steels you can design longer life, and/or less weight, and economy into your products. Let us show you how.

N-A-X Alloy Div., Dept. J-7
Great Lakes Steel Corp., Detroit 29, Michigan

☐ Please send me 12-page illustrated technical catalog on N-A-X HIGH-STRENGTH steels.

☐ Please have your representative contact me.

Name_____ Title_____

Company_____

Street_____

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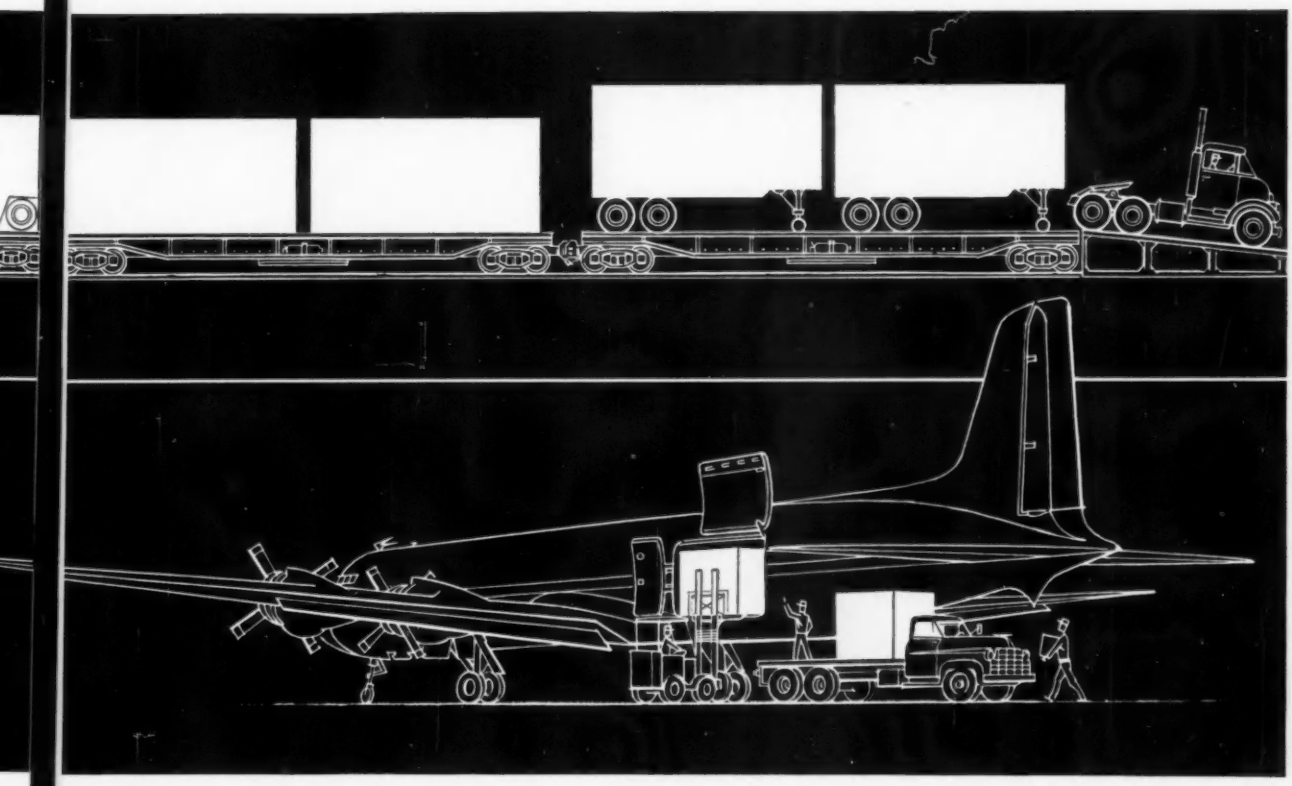
N·A·X®
HIGH-STRENGTH STEELS

N-A-X Alloy Division, Dept. J-7

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

NATIONAL STEEL CORPORATION



DIRECT

At end of cut, operator spins speed selector handwheel to new setting. Hydraulic power shifts gears while operator indexes turrets and repositions tools for next cut. There is no waiting, no stopping of spindle, no releasing of clutch.

PRE-SET

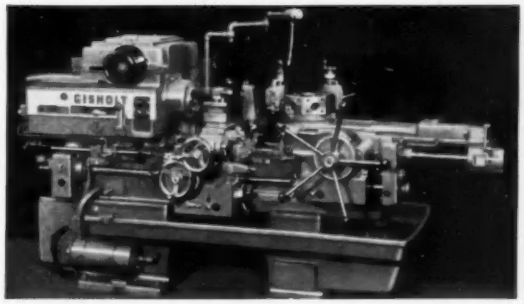
While machining is being performed, operator sets speed selector on desired speed for next cut. When ready to change, he simply taps Hi-Lo lever to initiate shift, and is free to index and ready tools for next cut.

HI-LO

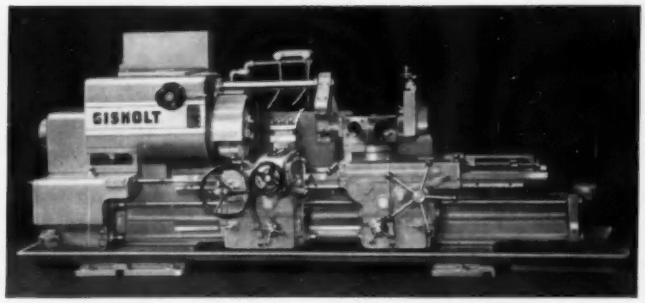
During either direct or pre-set operation, operator can reduce speed instantly in 8:1 ratio on Ram Type Turret Lathe, 6:1 ratio on Saddle Type Turret Lathe, by depressing Hi-Lo lever without changing speed selector setting. This is ideal when going from drilling, turning or boring to threading, forming or reaming. Raising Hi-Lo lever returns spindle to original speed.

Correct spindle speeds are determined quickly, easily without computing. Operator rotates knurled dial until desired surface speed shows in window. From then on he simply aligns work diameter number with Hi-Lo lever to obtain the correct spindle speed.

HYDRAULIC SPEED SELECTOR IS STANDARD FEATURE ON



GISHOLT MASTERLINE RAM TYPE TURRET LATHES. Available with up to 16 different spindle speeds, powered by up to 25 hp. single-speed driving motor. WRITE FOR LITERATURE.



GISHOLT MASTERLINE SADDLE TYPE TURRET LATHES. Available with up to 24 different spindle speeds, powered by up to 75 hp. single-speed driving motor. WRITE FOR LITERATURE.

WHY WAIT LONGER?

Get fast, smooth, effortless speed changes with Gisholt Hydraulic Speed Selector

A turn of this handwheel can influence your profit picture.

Offering a choice of pre-set or direct operation, the Gisholt Hydraulic Speed Selector eliminates time lost waiting for gears to shift. Your operator does not stop the spindle to make speed changes. Nor does he release the main drive clutch. All he has to know are his work diameters and desired surface speeds per minute. This means he can select the right spindle speeds quickly, effortlessly, without lengthy computation.

Consider what this means to your manufacturing processes: Because it is so *easy* for your operator to change speeds, he is continually encouraged to use the most effective speed for every operation, on all diameters, for all materials. Naturally a finer finish is obtained. Secondary operations are minimized. Maximum tool life is obtained. And your operator doesn't have to work as hard. Results: more output and better quality that can be measured.

The hydraulic speed selector is only one of many advanced features on the new Gisholt MASTERLINE Turret Lathes, both Ram and Saddle Types.

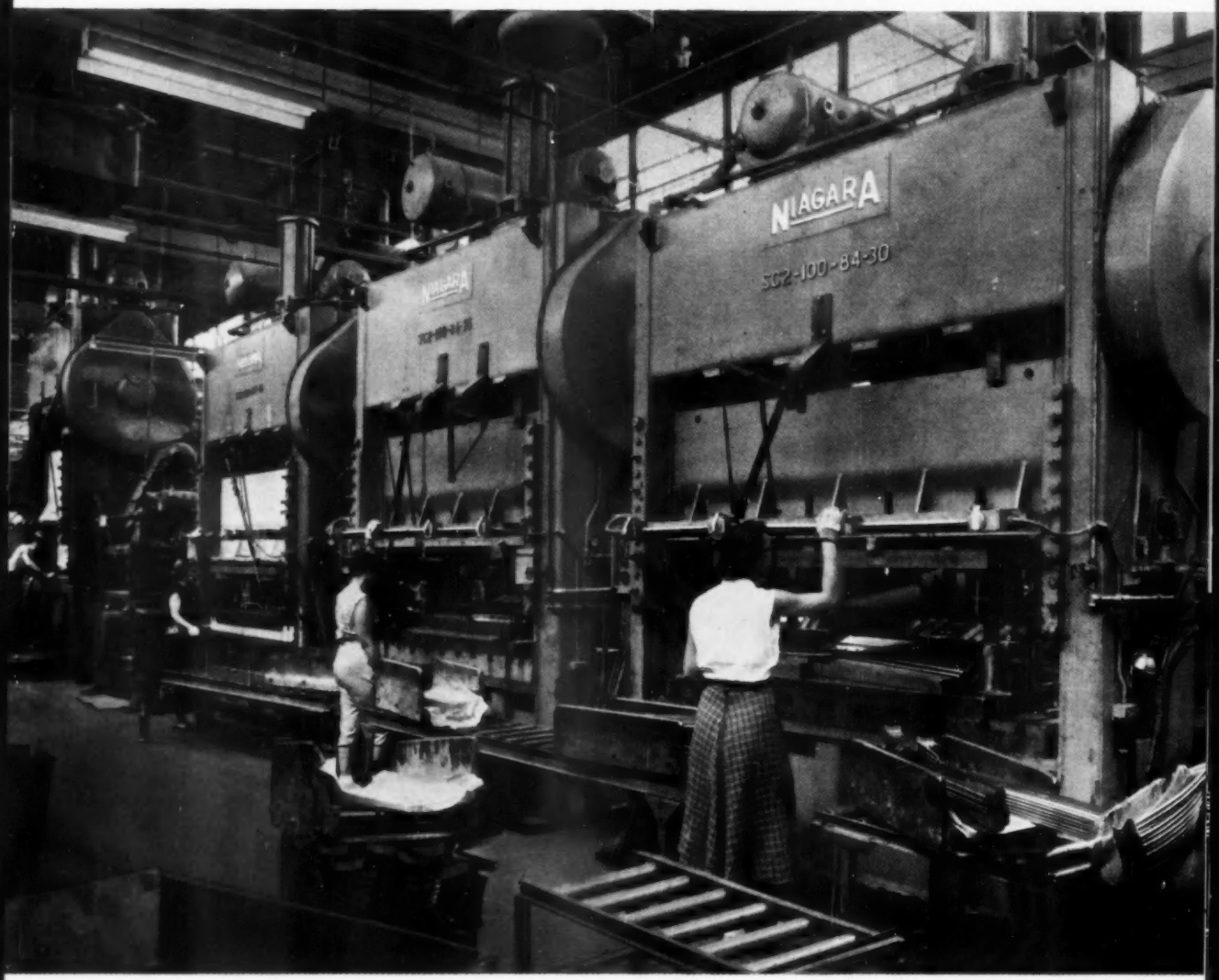
WHY WAIT LONGER? Call or drop a note to your Gisholt Representative now. You can rely on his experience—it will save you time and money in specifying. For more information, write to Gisholt Machine Company, Madison 10, Wisconsin.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

ASK YOUR GISHOLT REPRESENTATIVE ABOUT GISHOLT FACTORY REBUILT MACHINES WITH NEW MACHINE GUARANTEE

"we concentrate on Niagara



NIAGARA **DOUBLE CRANK STRAIGHT**

America's most complete line of presses, press brakes, shears, other machines and tools for plate and sheet metal work

presses...

In-line operation of four Niagara Series SC-2 Presses, engaged in progressive production of automotive side moldings from .025" #430 stainless steel.

Press operator shows a blank and formed molding which will grace one of the "Big Three" cars.

SIDE PRESSES

...they require a minimum of maintenance"

Producing up to 1,750,000 automotive moldings per month, these four Niagara Double Crank Straight Side Presses do the work of eight for a large Midwestern metal stamping firm. Their long beds enable the outfitting of each press with two sets of dies for two separate operations.

"We believe in standardizing. That is why we concentrate on Niagara Presses. They require a minimum of maintenance. When jobs come in, we are sure we can get them out. They are a volume machine," says the vice president and plant superintendent.

. . . and with good reasons, this famed line of Niagara presses requires a minimum of maintenance:

- *Rugged, integral, all-welded steel frames of exclusive triple box section design properly resist deflection to assure greater accuracy and longer die life.*
- *Laminated non-metallic ways of box type welded steel slides are a positive safeguard against scoring and assure trouble-free service.*
- *Low inertia pneumatic friction clutch reduces heat and wear. Only the shaft and driving plate are started and stopped at each cycle. Most of the clutch weight continues to rotate with the flywheel.*
- *Outboard mounting of clutch makes it accessible for easy maintenance . . . without disturbing any drive or crown parts.*
- *No adjustment for wear of clutch plate is necessary. It is self-compensating.*
- *Clutch linings are cycle-welded to plate, without rivets, increasing effective life.*
- *Brake shoes are full floating and self-aligning . . . cannot cock, bind or wear unevenly.*
- *Steel gears run in totally enclosed oil baths. Centralized pressure lubrication sends vital oil to journals, ways and wherever necessary for long efficient, service life.*

Like this well known metal fabricator, it will be profitable for you, also, to consider standardizing on Niagara presses. First of all, Niagara has the most to offer . . . straight side double crank, single crank and eccentric geared, open back inclinables and dozens of others. Secondly, in the words of the same company's purchasing agent: "The prices on Niagara Presses are right . . . and they do the job."

Built in 50 through 400-ton capacities, Niagara Double Crank Straight Side Presses are readily equipped with automatic feeds, variable speed drives, iron hands and other automatic materials handling devices so popular with the automotive and appliance industries. Post yourself on this important line by requesting Bulletin 64.

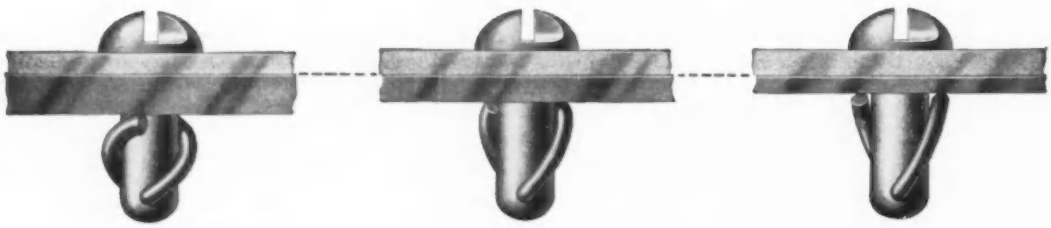
NIAGARA MACHINE & TOOL WORKS **BUFFALO 11, N. Y.**

DISTRICT OFFICES:

Buffalo • Cleveland • Detroit • Indianapolis • New York • Philadelphia

Distributors in principal U. S. cities and major foreign countries

This fastener works through thick and thin!

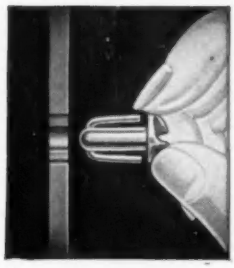


Spring-Lock—the easy-to-use removable fastener for modern designs—works whether panel thicknesses run over or under specifications! Spring wire deflects automatically to handle greater or lesser thicknesses. Spring-Lock's design flexibility makes it more than a fastener: it can be adapted as a shelf support, door strike, knob or any similar panel-mounted device. Many standard shapes and sizes of Simmons Spring-Locks are available from stock.

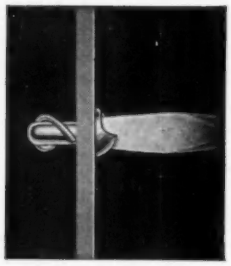
SEND TODAY for your copy of the NEW 40-page Simmons Catalog. Complete information, engineering drawings, and application data on Spring-Lock and other Simmons Fasteners. Engineering service is available. Samples on request.

See our 8-page condensed Catalog in Sweet's 1958 Product Design File.

HERE'S HOW SPRING-LOCK WORKS



1. *Insert fastener.*



2. *Half-turn locks it in place.*

With production costs on the uptrend, you can figure on Spring-Lock as an assembly time and money-saver, because:

- **Installation is BLIND**
- **Installation is EASY: no special tools are needed**
- **Installation is QUICK: a half-turn locks it in place**
- **Installation is SECURE: the *spring* steel *locks* the fastener, resists vibration**

SIMMONS FASTENER CORPORATION 1749 North Broadway, Albany 1, New York

QUICK-LOCK • SPRING-LOCK • LINK-LOCK • HINGE-LOCK • ROTO-LOCK • DUAL-LOCK

KENWORTH'S *new mountain movers feature* FULLER *Transmissions*

Probably the largest rear-dump semi being built today, Kenworth's 42′ 2½″ rock and ore mover is equipped with a Fuller heavy duty 4-speed Transmission.

The 228,000 lb. gvw Kenworth 803-B is designed to haul top payloads profitably over varied terrain. It is powered by a single 12-cylinder diesel engine, offered in either the 400 or 600 hp range. In the 400 hp version, illustrated, a Fuller 4-speed 4-MS-1440 Transmission with CO-11,500 Twin Disc Torque Converter delivers power efficiently and effectively from the powerful Cummins NHV series engine. These heavy-duty Fuller Transmissions provide the right gear ratios to apply the power profitably.

More than 100 different transmission models are available for rubber-tired equipment from 100 to 600 hp, 330 to 1550 cubic inch engines. Check with your truck manufacturer or write Fuller for the right transmission for *your* job.

FULLER

TRANSMISSIONS

FULLER MANUFACTURING CO. Transmission Division • Kalamazoo, Mich. Unit Drop Forge Div., Milwaukee 1, Wis. • Shuler Axle Co., Louisville, Ky. (Subsidiary) • Sales & Service, All Products, West. Dist. Branch, Oakland 8, Cal. and Southwest. Dist. Office, Tulsa 3, Okla.

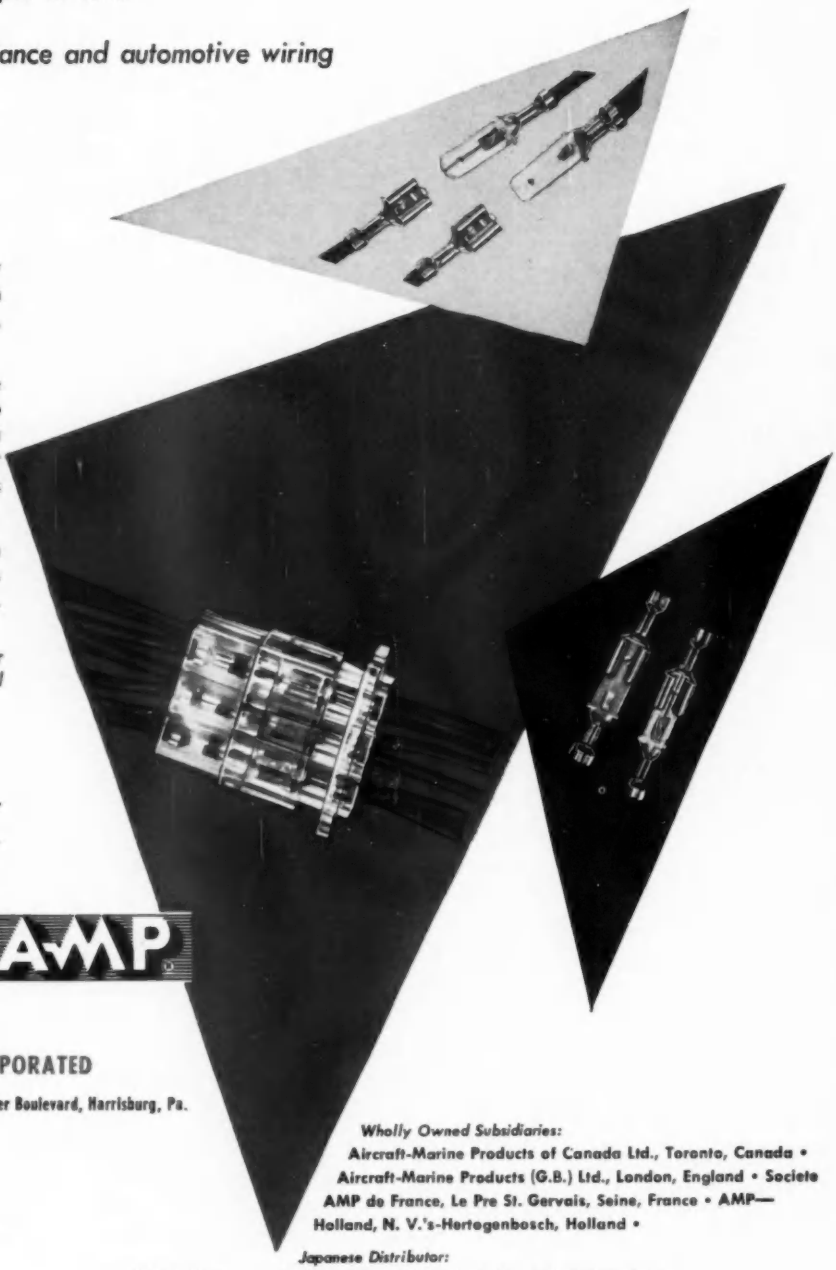
another result of A-MP'S CREATIVE APPROACH . . .

*Fastin-Faston** Harness Connectors

for simultaneous engagement

of multiple circuits

in appliance and automotive wiring



A new highly versatile assembly unit that makes one operation out of many. Saves time, trouble, money.

Simplifies such operations as the connecting of wall switches to built-in ranges . . . top with bottom circuits in clothes washer . . . front and back assemblies to car electrical systems.

Uses quick, easy-to-apply Faston terminals. Can be used for as many as six individual circuits.

Housing is fabricated of nylon for superior mechanical and electrical performance. UL approved.

Write today for additional information.

AMP

AMP INCORPORATED

General Office, 2252 Eisenhower Boulevard, Harrisburg, Pa.

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*TRADEMARK

ONE TRUCK...DOUBLE DUTY

SAVE SPACE! Mast up! Stacks high, makes full use of air rights. Helps you get full value from every foot of your warehouse space.

SAVE TIME! Mast down! Allows truck to enter low-headroom areas – eliminating time-consuming re-handling operations.

NEW YALE TRIPLEX MAST

FEATURES HIGH LIFT, LOW-HEADROOM CLEARANCE

for fast, continuous handling operations

210"-HIGH REACH – 96"-LOW SILHOUETTE
Boost storage capacity of present warehouse! Tier loads high as 210"! With mast up, take full advantage of air rights. With mast down, move safely into freightcars or trailer trucks–into any low-headroom area. Result: smooth, continuous flow of materials in and out of your storage, production and shipping areas.

New Yale Triplex Masts offer outstanding features–new interlocking I-beam construction for greater load stability–new open-front design that gives the driver full forward visibility.

Yale Triplex Masts are available with maximum fork-lift heights of 108", 144", 180", 198" and 210". With mast down, overall truck heights are 59", 71", 83", 90", and 96" respectively. Capacities: 3,000, 4,000 and 5,000 lbs. For full facts, write The Yale & Towne Mfg. Co., Philadelphia 15, Pa. Dept. A-71.

SEE YALE TRIPLEX MASTS IN ACTION AT THE...

1958 National Plant Maintenance & Engineering Show
International Amphitheatre
Chicago • Jan. 27 to 30

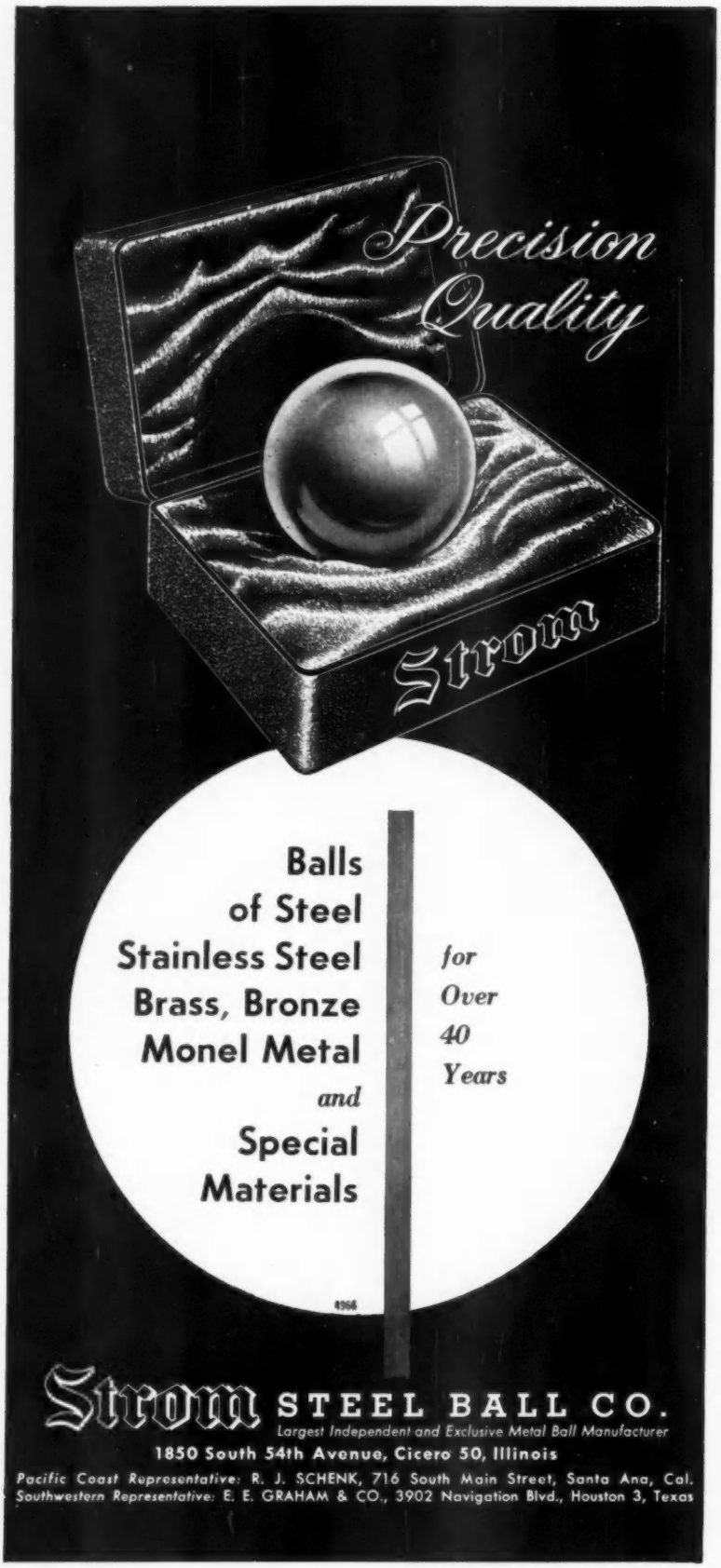
YALE* *REG. U.S. PAT. OFF.

INDUSTRIAL LIFT TRUCKS AND HOISTS

YALE & TOWNE

GASOLINE, ELECTRIC, DIESEL & LP-GAS INDUSTRIAL LIFT TRUCKS • WORKSAVERS
WAREHOUSERS • HAND TRUCKS • HAND AND ELECTRIC HOISTS

YALE MATERIALS HANDLING DIVISION, A DIVISION OF THE YALE & TOWNE MANUFACTURING CO. MANUFACTURING PLANTS: PHILADELPHIA, PA.; SAN LEANDRO, CALIF.



CALENDAR

OF COMING SHOWS AND MEETINGS

National Motor Boat Show, Coliseum, New York, N. Y.....Jan. 17-26

Truck-Trailer Manufacturers Association, annual convention, Palm Beach Biltmore, Palm Beach, Fla. .....Jan. 20-22

Electronic Industries Association, conference on automation systems, Arizona State College, Tempe, Ariz. .....Jan. 22-24

Institute of Aeronautical Sciences, 26th annual meeting, Sheraton-Astor Hotel, New York, N. Y. Jan. 27-30

Plant Maintenance and Engineering Show, International Amphitheatre, Chicago, Ill. .....Jan. 27-30

Society of Plastics Engineers, annual meeting, Cadillac Hotel, Detroit, Mich. .....Jan. 28-31

Instrument Society of America, national conference on chemical and petroleum instrumentation, Wilmington, Del. .....Feb. 3-4

Automotive Accessories Manufacturers of America Exposition, Navy Pier, Chicago, Ill.....Feb. 3-6

Reinforced Plastics Division of Society of Plastics Industry, Inc., annual technical and management conference, Edgewater Beach Hotel, Chicago, Ill....Feb. 4-6

American Society for Quality Control, Administrative Applications Div. annual conference, Carter Hotel, Cleveland, O...Feb. 7-8

Motor and Equipment Wholesalers Association, national convention, Statler Hotel, Los Angeles, Calif. .....Feb. 18-19

Pacific Automotive Show, Pan Pacific Auditorium, Los Angeles, Calif. .....Feb. 20-23

Leipzig Spring Fair, Leipzig, Germany .....Mar. 2-11

ASME Gas Turbine Power Div. Conference and Exhibit, Shoreham Hotel, Washington, D. C. Mar. 3-6

SAE Passenger Car, Body and Materials Meeting, Sheraton-Cadillac Hotel, Detroit, Mich...Mar. 4-6

Instrument Society of America, Pittsburgh Section Annual Conference on Instrumentation for Iron and Steel Industry, Roosevelt Hotel, Pittsburgh, Pa..Mar. 11-13

Steel Founders' Society of America, annual meeting, Drake Hotel, Chicago, Ill. .....Mar. 17-18

International Atomic Exposition, Inc., International Amphitheatre, Chicago, Ill. .....Mar. 17-21

SAE Production Meeting and Forum, Drake Hotel, Chicago, Ill. .....Mar. 31-Apr. 2

International Automobile Show, N. Y. Coliseum, New York, N. Y. .....Apr. 5-13

American Welding Society Show and annual technical meeting, Kiel Auditorium and Hotel Statler, St. Louis, Mo.....Apr. 14-18

American Society for Metals, Southwest Metal Exposition and Congress, Dallas, Tex. ....May 12-16

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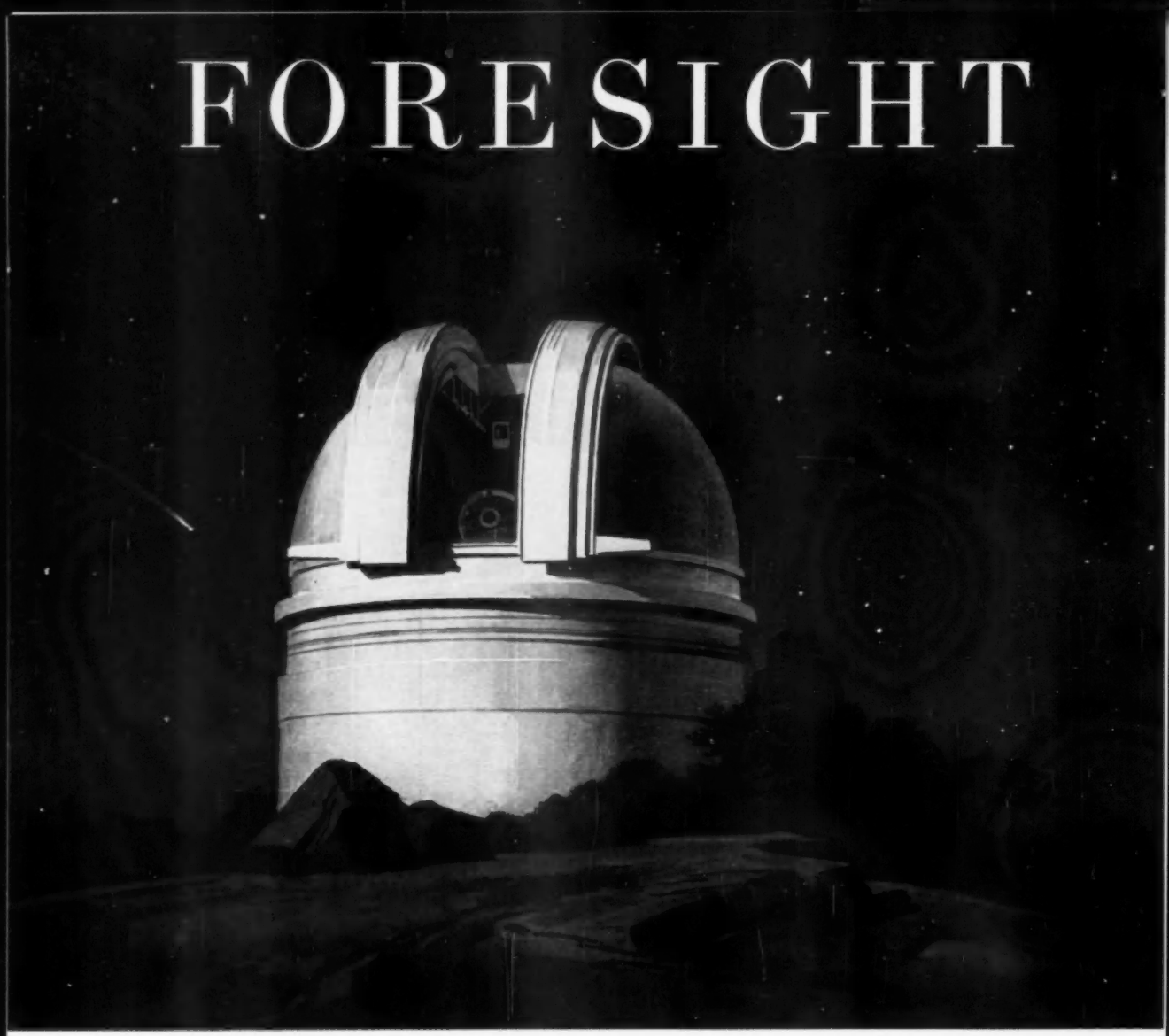

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Since the earliest days of the industry, Bendix foresight in product design and development has contributed materially to automotive progress.

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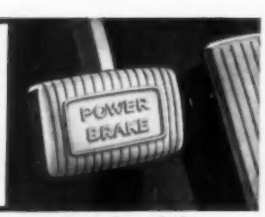

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High Spots of This Issue

▼ Automotive Forecast for 1958

This article covers the highlights of the past year and includes a penetrating analysis of prospects for 1958. It bases its findings upon a consensus of industry leaders, who expect passenger car sales to hit 6 million. The big question mark: contract negotiations and general economic conditions. Page 48.

▼ Industry Reviews and Previews

What's the outlook for American industry in the year ahead? In spite of recent setbacks, the answers given here by most industry analysts are moderately optimistic. Industries covered include steel, copper, aluminum, rubber, petroleum, and plastics. Page 50.

▼ Aircraft Industry

The year 1957 was one of unprecedented change in the aircraft industry; a year of record sales, as well as of widespread contract cancellations and cutbacks. It was also the year of the Sputnik. All these factors are evaluated here. Page 53.

▼ New Transfer Machines for Chevrolet Rear Axles

Chevrolet has made some changes in the rear axle housing of its 1958 line of passenger cars. As a reult, three unique LaSalle transfer machines have been installed at its Gear and Axle plant. The new sequence of operations is summarized here. Page 57.

▼ Ford's Heavy-Duty Trucks

This month Ford launches its line of heavy-duty and extra-heavy-duty trucks with all-new big engines. The engines, which employ wedge-shaped, fully machined combustion chambers, are described in detail, as are the highlights of the chassis. Page 58.

▼ 39 New Product Items And Other High Spots, Such As

Simplified storage system; use of aluminum; Chrysler's new stamping plant, cores for honeycomb structure; use of zinc in Edsel; new British tractors; plating Ford bumper bars; automotive developments; and industry statistics.

AUTOMOTIVE INDUSTRIES COVERS
PASSENGER CARS • TRUCKS • BUSES • AIRCRAFT • TRACTORS • ENGINES • BODIES • TRAILERS • ROAD MACHINERY • FARM MACHINERY • PARTS AND COMPONENTS • ACCESSORIES • PRODUCTION EQUIPMENT SERVICE EQUIPMENT • MAINTENANCE EQUIPMENT
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WHAT'S AHEAD...

in steel service and supply

New Steels—1958 will peak 1957 by the addition of scores of new sizes and types of steel. Stocked for ready shipment from strategically located Ryerson plants are such new products as:

• **Pre-painted Steel** . . . cold-rolled coils, in color choices, widths from ¾″ to 42″, gauges .006″ to .035″.

• **New Tubing** . . . hot finished carbon steel in wall thicknesses up to 1½″, O.D. sizes up to 12¾″.

• **Alloy Rebars** . . . reinforcing steel with high-yield point for space saving.

• **Alloy Plates** . . . hot rolled 8620 in 16 sizes, and hot rolled annealed 4140 in 19 sizes, thicknesses up to 5″, widths up to 84″.

These represent only a sample of the many additions in stock . . . and coming during 1958.

New Quality Safeguards—Already known for controls that protect you on every purchase, Ryerson is further revising and tightening its quality control program across the entire range of products. For example, new closer cutting tolerances are being established; specifications are being reviewed, and all phases of Ryerson service are being more exactly tailored to your needs.

Stepped-Up Service—To meet growing demand, new Ryerson plants have just been opened at Indianapolis and Charlotte . . . modernization and expansion programs are completed or under way at Los Angeles, Pittsburgh, St. Louis, Buffalo and Spokane.

1958 promises steel users further improvements in Ryerson plants and facilities. Delivery records, such as shipping five out of every six orders within 24 hours, and 60-minute emergency order handling will continue to assure you of getting exactly what you need *when* you need it.

As close as your telephone, you'll find a wider range of steel stocks . . . controlled high quality . . . dependable service that goes beyond the material itself. So, as you look ahead into 1958, it will pay you to include Ryerson in your plans.

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News

OF THE AUTOMOTIVE AND AVIATION INDUSTRIES

Vol. 118, No. 2 January 15, 1958

S-P Announces Three Packards To Complete Its 1958 Line

Studebaker-Packard Corp. has announced three new Packard models to fill out its 1958 Packard line. The 1958 Packard Hawk was introduced last fall.

Joining the Hawk are a two-door hardtop, a four-door sedan, and a four-door station wagon. The Hawk and the hardtop are new to the Packard line; the station wagon and sedan made up the 1957 line.

The three new models are powered by the Packard 289 cu in. overhead valve V-8 engine. Four barrel carburetion is standard with the engine, which is rated at 225 hp at 4500 rpm. Torque thrust is 305 ft/lb at 3000 rpm, and compression ratio is 8.3 to 1.

The hardtop and station wagon wheelbase measure 116.5 in., the sedan wheelbase, 120.5 in. Overall length is 206.2 in. for the station wagon, 209.2 in. for the hardtop, and 213.2 for the sedan.

Packard's new models are equipped with dual springs: one set carries the normal load, the second set takes over with heavier loads or on rough roads.

Optional features include power steering, seats and windows and air conditioning. Power brakes and Flightomatic transmission are standard equipment on all 1958 Packards.

Sleek Packard two-door hardtop is latest addition to Packard line

GM's Curtice Predicts 1958 Will Be A Competitive Year

General Motors president Harlow H. Curtice, in a year-end statement, predicted that 1958 would be a year of intense competition. "It appears likely that 1958 domestic retail passenger car sales exclusive of imports," he said, "will be somewhat lower than the 1957 total."

Mr. Curtice noted that consumer and business spending have been at record levels, but have eased off somewhat in recent months. This trend, he said, may well continue for the first half of 1958.

"But other factors," he added, "may result in an upturn during the second half of 1958."

Referring to retail sales of automobiles, Mr. Curtice observed that the picture would improve if an upturn in business in the second half materializes.

An all-important factor in the business picture, he said, is confidence on the part of both business and the consumer, and confidence at the present seems to be somewhat shaken. "I am convinced," he said, "that an important reason for the erosion of public confidence is to be found in worry over inflation."

Rambler American Price Set, Car To Go On Sale Jan. 30

American Motors has announced prices on its 100-in. wheelbase Rambler American, which will go on sale Jan. 30. Price of the deluxe two-door sedan will be $1789, including Federal excise tax but excluding state and local taxes, transportation and optional equipment. Price of the super two-door sedan, on the same basis, will be $1874.

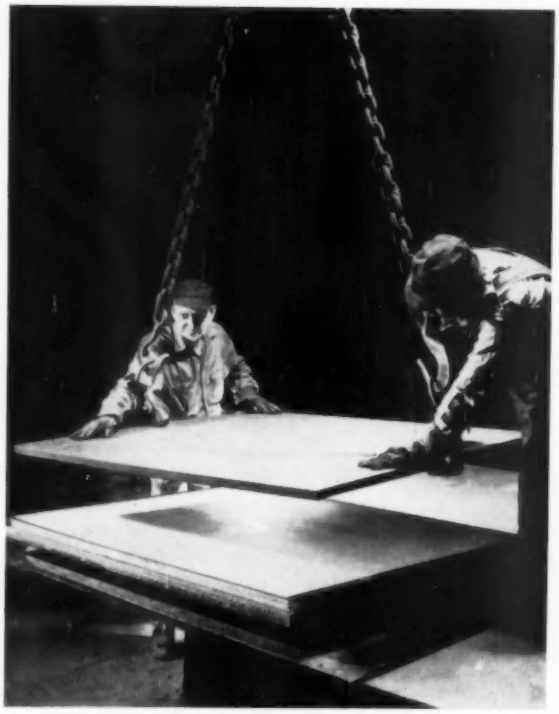
The Rambler American, first shown at the Chicago Automobile Show this month, is a revival of the short wheelbase model which AMC dropped after 1955. AMC hopes to sell 25,000 Rambler Americans this year. In the first month of production (December) 2131 units were built.

Volkswagen Says It Will Not Change Basic Construction

Volkswagen officials say they will not change the basic form and construction of their small passenger car "for a long time to come."

VW recently produced its two millionth postwar car at its plant at Wolfsburg, West Germany. Production for 1957 was listed as 470,589 cars, up from 395,690 in 1956. Of the total output 269,198 were exported.

Shipments to this country have increased some 28 per cent during 1957, according to the latest registration figures. The Volkswagen total for 1957 will approach 65,000 cars.



STEEL SANDWICH

Workmen at Homestead District works of U. S. Steel Corp. lower a carbon steel cover plate on an experimental "sandwich" filled with stainless steel plate. Hot rolling reduces the sandwich to about 10 per cent of its original thickness. Using the new technique, the company has produced sheets 90 in. wide and 230 in. long, which is about twice as wide as sheets produced by conventional methods. The project was undertaken to find a method of producing wide thin-gage stainless and alloy steel sheets for aircraft and missile applications.

U. S. Passenger Car Output Hit 6,119,307 Units in 1957

Passenger car production in the U. S. totaled 6,119,307 units during 1957—a gain of about 5.4 per cent over 1956—making 1957 the fourth best car production year in history.

Truck and bus production, however, fell off during 1957 by about 21,000 units to 1,090,000.

Outstanding in the car production figures for 1957 were the changes in percentage shares of the various companies. General Motors built 2,816,446 cars last year, some 6.7 per cent below its 1956 production. As a result, GM's share of the total fell from 52.7 per cent a year ago to 46 per cent in 1957.

Chrysler and Ford, on the other hand, showed percentage increases in 1957. Chrysler's final production tally was 1,222,338 cars for 19.9 per cent of the total. A year ago Chrysler built only 870,261 cars for 15 per cent.

Ford's 1957 total was 1,889,710 cars for 30.9 per cent of the total. A year ago, Ford built 1,669,166 passenger cars for a 28.7 per cent share.

American Motors showed a gain in 1957, with production of 114,084 cars for about 1.86 per cent, compared with 104,190 cars a year ago. Studebaker-Packard Corp., however, dropped from 95,834 cars a year ago to only 72,499 in 1957. Its percentage also decreased.

Ford and Chevrolet figures form an interesting comparison. According to their own production statistics, Ford built 1,522,406 passenger cars in its U. S. plants during 1957, and Chevrolet built 1,522,550 — a difference of only 144 cars.

COLD REDUCING MILL

Jones & Laughlin Steel Corp.'s new $10 million, 77-in. cold reducing mill can produce 70,000 tons of sheet per month, about double the capacity of the mill it replaces. Located at J&L's Cleveland works, the new mill can roll sheet steel from coils weighing up to 60,000 lb at 20 to 40 mph. Much of the product will be used by the automobile industry.

AMC Announces Air Suspension System On Rear Wheels Only

American Motors has announced a low-priced air suspension system that combines air bellows and coil steel springs on the rear of the car. The new system, reported in AI, Dec. 15, p. 33, will go into production Jan. 20 and will be available as optional equipment on all AMC cars except the Rambler American.

Cost of the system, called Air Coil Ride, will be $98.50.

AMC said it decided to concentrate its air suspension efforts on the rear wheels, since additional weight in a car goes mostly to the rear. The result is a less expensive and less complicated system, according to the company.

The Air Coil Ride, while retaining steel coil springs on the rear, has the level ride feature of other air suspension systems. An automatic leveling valve increases air pressure in the bellows when weight is added to the car, maintaining the same car level.

Erratum

Through a typographical error, the engine tabulation printed in Automotive Industries (Dec. 1, 1957, p. 61) listed the Dodge D-500 engine with the two, four-barrel carburetor package in 33rd place, with a bhp/cu in. ratio of 0.803. The correct ratio for this engine is 0.886 and, accordingly, it should have been listed in tenth place on the tabulation, among the leading engines of the group.

New White Models Catch On; Production Upped 20 Per Cent

White Motor Co. has announced that production at the company's Cleveland plant is being increased by about 20 per cent. Wide acceptance of new models introduced during the late fall is given as the reason.

White recorded heavy orders during November and December. According to J. E. Adams, vice-president - manufacturing, a substantial part of the order increase is due to the strengthening of White's Diesel truck line. Another factor has been the introduction of new construction models.

White laid off about 8 per cent of its production force last October during an industry-wide decline in sales of heavy trucks. Workers have been called back to meet the new production schedule needs, according to Mr. Adams.

"Consumer Hesitancy" Cited As Key Factor In '58 Outlook

Ford Motor Company economist George P. Hitchings says that consumer hesitancy in making commitments is likely to keep car sales below normal during 1958. "Normal" sales would provide a retail market somewhat above the 6 million cars (including 200,000 imports) sold during 1957, according to Mr. Hitchings.

But a decline in business activity affects car buying even by those whose incomes have not been reduced, he explained.

The long-run outlook for the automobile industry, however, is not changed as a result of a slowing down in one year, he added. The automobile market is sensitive to shifts in consumer incomes and psychology, but these shifts should not be allowed to proceed too far.

Chevrolet To Add Floor Space At Its Atlanta Assembly Plant

Chevrolet Motor Div. will add approximately 385,000 sq ft of floor space at its automobile and truck assembly plant at Atlanta, Ga., bringing the total plant area to 792,000 sq ft. The new addition is scheduled for completion in 18 to 24 months.

Chevrolet says the expansion will give more flexibility for the complex assembly of customized products with their increasing numbers of options, body styles, colors and accessories. Most of the new building will be two stories high.

De Soto Adventurer Makes Bow, Is Available in Two Models

The 1958 De Soto Adventurer limited production series is available as a two-door hardtop or a convertible (shown). The car made its bow at the Chicago Automobile Show earlier this month.

Engine size on the '58 Adventurer has been increased to 361 cu in. with bore of 4.12 in. and stroke of 3.38 in. Compression ratio is 10.25 to 1 and horsepower rating is 345. Standard equipment includes two four-barrel carburetors, Torque-Flite transmission, power brakes and added trim.

Low-Priced Mercury Medalist Lists Economy as Feature

The new low-priced Mercury Medalist (see illustration above) lists fuel economy of 8 to 20 per cent as a major feature. The Medalist went on sale this month.

"Tests have shown that with overdrive the Medalist engine can increase fuel mileage as much as 20 per cent," proclaimed Lincoln and Mercury Division general manager James J. Nance in making the Medalist announcement. The Medalist is powered by an overhead valve V-8 engine with 312 cu in. displacement and rated at 235 hp. Compression ratio is 9.7 to 1.

The Medalist two-door sedan is priced $98 below the lowest priced Mercury Monterey.

The Medalist is equipped with standard transmission. Overdrive and manually operated Merc-O-Matic automatic transmission are optional.

FORD VAN

Newest addition to the English Ford line is this ¾-ton Thames 800 van, now being offered in the American market. It is powered by a short-stroke, overhead valve engine that develops 59 bhp at 4200 rpm, and has a maximum payload space of 180 cu ft. The Thames 800 is also available in a cab and chassis version.

NEWS AUTOMOTIVE AND AVIATION

Mack cross-country bus features full-length observation deck

Ford Spent $30 Million To Tool For Production of Thunderbird

Ford Div. reports it spent $30 million to bring out the 1958 four-passenger Thunderbird. This is about three times the cost to develop and tool the two-passenger Thunderbird, according to division general manager J. O. Wright.

The new Thunderbird, introduced this month, is aimed at the luxury market rather than the sports car class. The '58 model is larger, more fully equipped, more luxurious than its predecessor.

Dodge and Imperial Offering Unique Tire Options in '58

Here are two developments in passenger car tire applications: Dodge is offering Goodyear's "captive air" tires on all 1958 models, and Chrysler Div. is providing new 11.00 x 14 in. tires on the 1958 Imperial line.

Dodge Div. said the Goodyear tire, capable of going 100 miles after a puncture, eliminates the need for a spare tire. This would provide more trunk space.

The new "Custom Super Soft Cushion" tires, optional on the 1958 Imperial, carry recommended pressures of 14 lb in the rear and 17 lb in the front. Standard Imperial tires are 9.50 x 14 in. and carry 22 lb front and rear.

Colbert Sees Potential For Good Year In Auto Industry

L. L. Colbert, president of Chrysler Corp., believes the potential exists for a good year for the automobile industry in 1958.

In a year-end statement, he said there is a strong probability that a sizable portion of the people who bought cars in the record year of 1955, plus a good number of the 1956 and 1957 buyers, will be in the market again in 1958.

One reason is the fact that nearly 60 per cent of the cars bought in 1955 were purchased with credit notes of 30 to 36 months. These will be paid off during the next 12 months, he explained.

Another reason is the fact that a large percentage of the cars on the road today will be three years old during 1958. Normally, he said, three out of five trade-ins on new cars are three years old or younger.

Population growth and the growing suburbs are two important factors that point to an increased market over a long-range period, he said.

J. & L. To Construct Stainless Steel Mill

Jones & Laughlin Steel Corp. plans to spend about $16 million on a stainless steel sheet and strip mill now under construction at Louisville, O.

Operations at the new plant are scheduled to begin in the third quarter of 1958, according to Martin K. Schnurr, president of the firm's Stainless Steel Div.

Mr. Schnurr said that the plant will be able to produce about 36,000 net tons of steel sheet and strip a year.

Everybody Sits "Upstairs" In New Cross-Country Bus

A new 39-passenger cross-country bus has been built by Mack Trucks, Inc., for Greyhound Corp.'s Scenicruiser System. It will also be available to other intercity bus operators.

External dimensions (40 ft long, 8 ft wide, 11 ft high) are the same as for standard intercity buses.

The bus, which was unveiled last month (December), has a full-length observation deck, which enables all passengers and the driver to ride in a "panoramic dome."

The bus has front and rear wraparound windshields, and daylight transparent roof panels down the center aisle. It is said to have 50 per cent more glass area than other American buses.

Passenger comfort and convenience features include air conditioning, single-level floor for ease of movement, foam-rubber reclining seats, large rear lounge, modern lavatory, reading lights and folding utility tables for each passenger.

The bus is powered by Mack's 225-hp, turbocharged Thermodyne Diesel. All other major components, including the airglide suspension system, transmission, and axles, are also built by Mack.

M-H-F Buys Detroit Gear Plant Of Long Manufacturing Div.

Massey-Harris Ferguson Ltd., Canadian tractor builder, has purchased the Detroit gear plant of Long Mfg. Div. The tractor firm says it will retool the plant for production of parts and components for a new series of tractors.

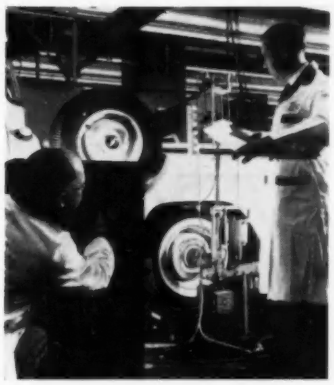
M-H-F recently announced it will move its U. S. tractor manufacturing operations from Racine, Wis. to Detroit after June 30, 1958. Parts production at the former Long Mfg. plant, which ended its operations last month (December) will begin later in 1958.

GM Employes Vie For $500,000 In Golden Anniversary Contest

General Motors employes are competing for $500,000 in prizes in a letter-writing contest scheduled as part of GM's "Golden Milestone" observance. Subject of contest letters is what GM's first 50 years have meant to the employe and his community.

GM began its anniversary year celebration last November with a nationwide telecast.

AI TABLOID



Chevrolet's "ride simulator"

Electronic Device Saves Time In Suspension System Tests

Chevrolet credits an electronic laboratory testing device with cutting weeks from the time required to test experimental automobile suspension systems.

The device, known as a "ride simulator," measures the effectiveness of new coil and air springs without extensive road tests. The vehicle remains stationary while the suspensions are subjected to the stresses that would be encountered with normal loads on typical road surfaces.

A powerful hydraulic flexing device alternately compresses and distends an experimental suspension on signals from an electronic control unit. Photographs of the suspension's oscilloscope chart permanently record the test.

Ford Displays Futuristic La Galaxie at Chicago Show

Ford Motor Company unveiled a full-scale, futuristic car called La Galaxie at the recent Chicago Automobile Show. The experimental car was developed to combine styling concepts with engineering and technical advancements.

La Galaxie measures only 51.8 in. in height, but over-all length is 223.6 in. and width is 80.1 in. Wheelbase measures 126 in.

The futuristic car was the only full-size model in the Ford experimental display. Six 3/8 scale models also were shown.

La Galaxie's windshield swings into the roofline to cover the entire front seat. The "butterfly" top swings open from the center to permit easy entrance.

The model car at present does not operate. Many of its features, according to Ford vice-president and director of styling George W. Walker, are still in the advance styling studios.

B. F. Goodrich Chemical Co. reports that it has developed the first nitrile rubber to resist ozone cracking. Compounds of the new rubber, called Hycar 1072, were unaffected by ozone even after they were soaked in oil for 70 hours at 212 F before exposure to ozone.

* * *

A remote control outside rearview mirror is now available at Mercury dealerships as a dealer-installed option. The driver can adjust the mirror glass to the proper viewing angle by moving a small lever mounted on the instrument panel.

* * *

Baker-Raulang Co., a wholly owned subsidiary of Otis Elevator Co., has been reorganized and will be known henceforth as the Baker Industrial Truck Div.

* * *

Superior Tube Co.'s new million-dollar plant in Wapakoneta, O., is now completely equipped and in full production of small-diameter, cold-drawn tubing from 0.010-in. to 0.500-in. diameter and of cathodes for electron tubes.

* * *

Thompson Products, Inc., and Ramo-Wooldridge Corp. have formed a new subsidiary—Thompson-Ramo-Wooldridge Products, Inc., to produce industrial process control instruments. The firm's first product will be an electronic computer for process control.

* * *

Shell Oil Co. has developed a new class of greases for high-temperature, high-speed application in missiles and supersonic planes. The new lubricants, called Shell ETR (extreme temperature range) Greases, can withstand temperatures up to 600 F and protect metal parts running at speeds up to 30,000 rpm, the company says.

* * *

Nine U. S. companies in the precious metals and precision manufacturing fields have consolidated to form Engelhard Industries, Inc., a $200 million-a-year firm. Its products will include atomic-reactor components, nuclear instruments, aircraft and missile parts, and equipment for the petroleum, chemical, plastics, automotive, and electrical industries.

Norton Co. has reorganized its Research and Development Dept. into four major sections: abrasives, refractories, basic exploratory research, and laboratory services.

* * *

General Motors Diesel Engine Div. has begun construction of a 289,000 sq ft addition to its plant in Redford Township. The new building will house all final assembly, testing, and shipping facilities.

* * *

National Lead Co. and Celanese Corp. of America are collaborating in a research program to produce improved polymers for plastics and fibers using polymerization catalysts developed recently by National Lead's research laboratories.

* * *

Utical Metals Div. of Kelsey-Hayes Co., a pioneer in the vacuum melting field, has completed a new 110,000 sq ft plant near Utica, N. Y., and expects to be in full production early this year.

* * *

Walker Mfg. Co. has purchased Galt Metal Industrial, Ltd., of Canada and will operate the firm as a subsidiary. Galt, an important supplier of automotive components, will become the manufacturing source of Walker automobile exhaust system parts for the Canadian market.

* * *

General Electric scientists have developed an experimental electronic device that changes heat energy directly into electrical energy. The new device, called a thermionic converter, has converted more than eight per cent of the applied heat energy into useful electrical power.

* * *

A new engineering group known as C Stellarator Associates has been formed by Allis-Chalmers Mfg. Co. and Radio Corp. of America. Purpose: to design and build a facility at Princeton University for advanced research into controlled thermonuclear reactions.

* * *

Oakite Products, Inc., has formed two new divisions as part of its nationwide field organization —an upper New York State Div., with headquarters in Rochester, and a mid-South Div., with headquarters in Louisville, Ky.

AVIATION MANUFACTURING

ATLAS ICBM

This dramatic photo of the Convair Atlas ICBM was made during the missile's first test flight at the AF Missile Test Center, Cape Canaveral, Fla. The Atlas has since been successfully flight-tested for the first time over a limited range of a few hundred miles. Full-scale production of Atlas, the Air Force's No. 1 intercontinental ballistic missile is scheduled for December, 1959.

Air Force Eyes Beryllium Use in Tomorrow's Planes

The Air Materiel Command of the Air Force has awarded a $300,000 contract to Brush Beryllium Co. of Cleveland for the development of techniques for manufacturing sheet beryllium as a material for aircraft and missiles.

Although the dollar value of the contract is small, Brush Beryllium officials regard it as an important breakthrough for this relative newcomer among commercial metals.

The contract, which will cover a two-year period, represents the first major attempt, company officials say, to bring the metal to the production stage by developing rolled sheet beryllium from pressed powder slabs. After the problem of rolling large sheets has been solved, the company will go on to develop forging, casting, and extrusion techniques.

The Air Materiel Command looks forward to a wide application of the metal in missile systems and high-speed aircraft because of the following advantages:

It is three times stronger than steel on a strength-to-weight basis; it is only two-thirds as heavy as aluminum; and it will maintain its properties at temperatures well above 1000 F.

But beryllium is difficult to shape and is also expensive, the Air Command points out. The estimated installed cost of a finished beryllium structure is $75 to $100 a pound, compared with $20 to $40 for aluminum structures.

The metal has seen limited use up to now—primarily in atomic energy applications and, commercially, in X-ray machine windows.

Chance Vought Gets Contract To Build F8U-3 Navy Fighter

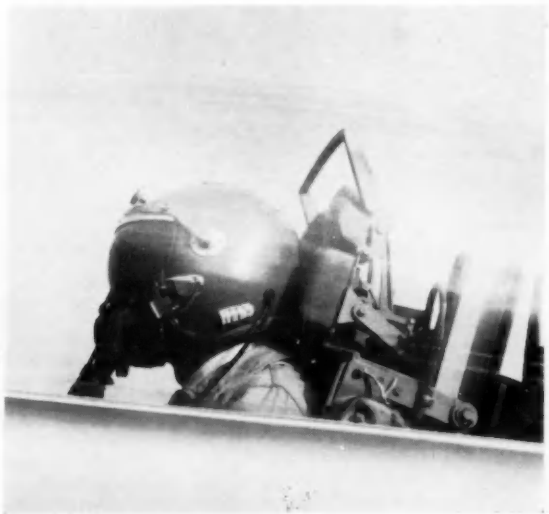
Chance Vought Aircraft, Inc., has received a $100 million contract from the Navy for production of the F8U-3, an advanced all-weather jet fighter capable of flying over 1400 mph.

The contract comes on the heels of a $200-million award, announced last month, for production of the F8U-1 Crusader and for volume production of the F8U-2. The F8U-2 is an improved version of the F8U-1. The F8U-3 is completely redesigned.

Chance Vought has been working on the new F8U-3 under a development contract awarded early in 1957, a Pentagon announcement said. The plane is scheduled for flight testing by next summer and for delivery to the fleet by 1960.

D-SHAPED BAR

The D-shaped bar projecting above the helmet of the North American F-100 pilot in photograph was cast from a new high-strength aluminum alloy, called Tens-50, which was developed by North American Aviation's Los Angeles Div. The bar, which acts as a canopy breaker when the seat ejects, was formerly machined from bar stock at a cost of $350. Cast in Tens-50, the part now costs $15.



Chrysler Gets Army Contract For Jupiter IRBM Assembly

Chrysler Corp. has been awarded a $52 million contract for mass production assembly of the Army's 1500-mile Jupiter intermediate range ballistics missile and furthur production of the Redstone missile.

Chrysler has been building the Redstone at a government-owned plant in Warren, Mich. The Jupiter also will be assembled at the Warren plant under the new contract. Many parts of the two missiles are interchangeable, a fact which will facilitate production of the Jupiter.

According to the Army's announcement, the $30 million Jupiter segment of the contract will cover components which require long lead time, and also ground support equipment for the missile. The balance of the contract, about $21.8 million will cover further Redstone production.

Chrysler has been working on the development of the Jupiter at the Army's Ballistics Missiles Agency at Huntsville, Ala.

First T2J Navy Jet Trainer Rolls Off Assembly Lines

The first T2J all-purpose jet trainer has rolled off production lines, according to an announcement by Columbus Div. of North American Aviation, Inc.

At the same time, the company revealed that it is completing negotiations with the Navy for a $37.5 million contract covering the T2J trainer. The number of planes involved in the contract was not disclosed.

The tandem-seat jet is powered by a Westinghouse J-34 jet engine that develops 3400 lb thrust. It will have a top speed of about 500 mph, a service ceiling of over 40,000 ft, and a range of 840 nautical miles.

North American Gets Contract For WS-110A Chemical Bomber

North American Aviation, Inc., has been awarded a multi-million dollar Air Force contract to build prototypes of an intercontinental bomber that will fly over 2000 mph at altitudes up to 100,000 ft.

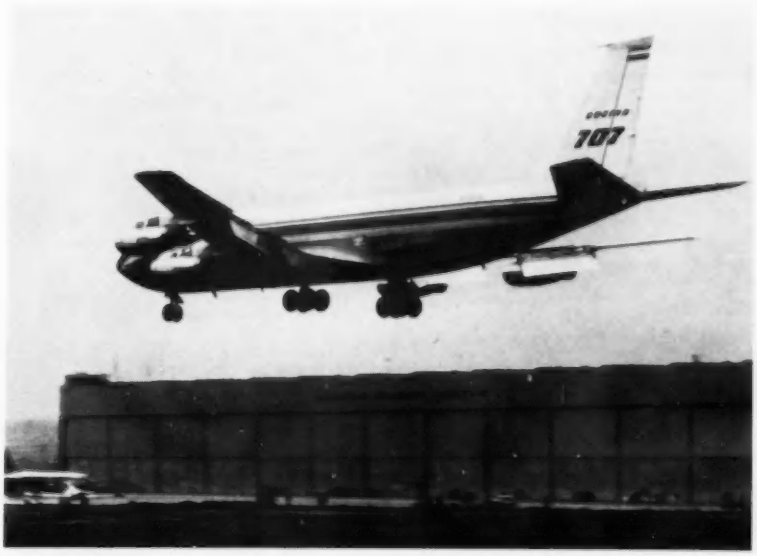
The new plane, known as the WS-110A, will have six superjet engines and use a new chemical fuel, now being developed by Olin Mathieson Chemical Corp. This fuel is part of a new series of high-energy fuels, known as boranes (boron and hydrogen compounds), currently under test by military authorities.

TIGER PACKS A DEADLY PUNCH

Grumman Aircraft's F11F-1 Tiger, now in service with the Navy, is shown carrying the deadly Sidewinder air-to-air missile, a rugged, inexpensive weapon built to operate against high-performance aircraft. Recent tests in all flight conditions have demonstrated the Tiger's launching capabilities.

BOMARC

First production Bomarc IM-99 area defense missile completed by Boeing Airplane Co. is shown as it was rolled from the assembly line in Seattle recently. Rollout and delivery to Air Force marked beginning of a production program to supply Bomarc missiles to bases around the country.



BOEING 707 STRATOLINER COMPLETES FIRST FLIGHT

America's first commercial jet transport, the Boeing 707 Stratoliner, is shown as it comes in for its first landing in a driving rainstorm, just seven minutes after taking to the air for its initial flight. The first of the 707s will be delivered to Pan American World Airways this year, following certification by Civil Aeronautics Administration.

AVIATION MANUFACTURING

New Skylane airplane is top model in Cessna's middle-priced line.

Cessna Adds New Skylane To Middle Line for 1958

Cessna Aircraft Co. has added a third airplane, the Skylane, to its middle-priced line for 1958. The new plane, with a factory list price of $16,850, will be the top model in the line, which includes the models 180 and 182.

The Skylane, a deluxe version of the 182, has the same basic airframe, but is more fully equipped and is slightly faster. It is painted all over in a three-color exterior paint combination and is equipped with special new fiberglas fairings.

The new plane has a full instrument panel, which features a choice of Lear or Narco omni-transceiver with crystals and low-frequency range; direction and horizontal gyros; altimeter; clock; outside temperature gage; and rate-of-climb and turn-and-bank indicators.

Other standard equipment on the Skylane includes tinted glass on all windows, navigational light flasher, and a tow bar modified for use with speed fairings.

The plane is powered by a six-cylinder 230-hp Continental 0-470-L engine, has a top speed of 168 mph, and a cruise speed of 158 mph.

Bendix Aviation Net Reaches All-Time High for Fiscal Year

Bendix Aviation Corp. sales and earnings were at a record level in its fiscal year ended Sept. 30, Malcolm P. Ferguson, president, reported in the annual statement.

Net income was up 13.3 per cent to $27,499,034, compared with earnings of $24,278,263 for fiscal 1956. Sales for fiscal 1957 totaled $706,984,631, a peacetime record for the company and 22.3 per cent above last year's total of $578,000,000.

Sales of automotive products in 1957 were at a record level of $118,000,000, up 12.4 per cent from the previous year, the report said. Although automobile production for 1958 is estimated at a lower rate than 1957, Mr. Ferguson said that Bendix expects to maintain its dollar volume of automotive sales.

Mr. Ferguson reported that in the last months of the fiscal year, the trend of the company's backlog has been reversed. From a high point of almost $600 million, it declined to $526 million on Sept. 30, compared with $544 million a year ago.

Lockheed Missile Sales in '57 Are 8 Per Cent of Peak Total

One third of Lockheed's advanced projects are being carried out by the company's mushrooming Missile Systems Div. at Sunnyvale, Palo Alto, and Van Nuys, Calif., according to a report by board chairman Robert E. Gross.

"Missile sales represented 8 per cent of Lockheed's all-time record total of more than $900 million in 1957. This proportion is expected to climb to 20 per cent in 1958 as work is accelerated on various programs, including the Navy's long range fleet ballistic missile, the Polaris," Gross said.

Exceptionally heavy deliveries of commercial airliners plus growing missile activity were major factors in the 21 per cent rise in sales for 1957 over the $743 million reported for 1956, Gross reported.

The Lockheed chairman said that he expects the company's backlog during 1958 to average close to the $1.3 billion total at year-end 1957, but he predicted that a greater proportion would be in missiles. He also estimated that sales in 1958 will total about $750 million, a decline from the 1957 level.

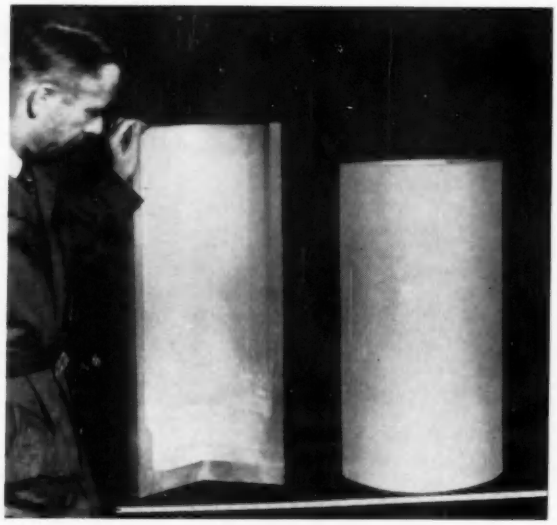
Ramo-Wooldridge Establishes Space Technology Laboratory

Ramo-Wooldridge Corp. announced that it has established a new operating division to be known as the Space Technology Laboratories.

The new division is an outgrowth and extension of the former Guided Missile Research Div., which was responsible for the technical direction and systems engineering for the Air Force Ballistic Missile Program Atlas, Titan, and Thor missiles.

IMPACT EXTRUSION

This huge impact extrusion, produced by Harvey Aluminum for a missile body section, is 32 in. long, 14 in. in diameter, has a wall of 0.875 in., and weighs 112 lb. Sectioned impact on left indicates the full extruded length; piece on right has been trimmed to customer's specifications. Company says it is now impacting other aluminum missile components on a production basis, such as oxidizing chambers, liners, and motor parts.



MEN IN THE NEWS

Pontiac Motor Div., General Motors Corp. —W. E. Schoon has been appointed advertising manager.

Bendix-Westinghouse Automotive Air Brake Co.—**D. O. Thomas** was elected chairman of the board, and **Willard B. Paine** has become president and chief executive officer.

General Motors Corp., Delco Products Div.—**Vincent B. Blair** has been named general manager, succeeding **Frank H. Irelan,** retired.

Alan Wood Steel Co.—**Howard W. Read** was elected vice-president, planning and control.

International Nickel Co., Inc. — **Albert P. Gagnebin** and **L. E. Grubb** were named assistant vice-presidents.

International Harvester Co.—**Harold B. Myers, David G. Moyer,** and **Ralph M. Buzard** were elected vice-presidents.

Dresser Industries, Inc. — **R. E. Reimer** and **John Lawrence** have been appointed executive vice-presidents.

Minneapolis-Honeywell Regulator Co. — **Walter W. Finke** has been elected a vice-president.

General Electric Co., Production Engine Dept.—**Miles K. Wolfson** was appointed manager of engineering; **Carl E. Anderson,** manager of manufacturing; and **Nicholas F. Frischhertz,** manager of spare parts and engine rebuild.

New York Air Brake Co., Kalamazoo Div.— Howard W. Brandt has become general manager.

A. O. Smith Corp.—S. E. Wolkenheim was elected vice-president, marketing; and U. T. Kuechle was named vice-president, automotive division.

General Motors Corp. — **Ivan L. Wiles** has retired as executive vice-president.

American Felt Co. — **Kenneth R. Peattie** was elected vice-president in charge of procurement, and **R. Power Fraser, Jr.,** has become general sales manager, succeeding **Jule F. Marshall,** retired.

Ford Motor Co., Aircraft Engine Div.—**Michael E. Madden** was appointed manager, production programming and control department.

Baldwin-Lima-Hamilton Corp. — **Ralph N. Conner** was named Southwestern district manager.

Studebaker-Packard Corp. — **Glenn Finney** has been named manager of dealer development.

Motch & Merryweather Machinery Co.—**Donald M. Patterson** has been appointed vice-president and general sales manager of both the Euclid and Avey Mfg. Divs.; **Warren R. Lowe,** general manager of the Avey Div.; and **George W. Drees,** assistant general manager.

Eaton Mfg. Co., Axle Div.—**Edwin A. Dippo** has been promoted to manager of production planning.

Clearing Machine Corp. — Eugene P. Cunningham was named vice-president in charge of sales and administration.

Purolator Products, Inc. — Charles W. Wulff was named manager of original equipment sales.

Micromatic Hone Corp. — **William H. Harris, Jr.** has been named executive vice-president, and **William J. Pinkerton** has become administrative vice-president.

SKF Industries, Inc.—**Thomas W. Dinlocker** was appointed chairman of the finance committee of the board of directors, and **William J. Wiley** was elected vice-president, finance.

Associated Spring Corp.—**William R. Johnson** has been appointed chief research metallurgist, and **Richard J. McCluskey** has been named chief machine design and development engineer at the Bristol research center.

Necrology

Willard M. Cornelius, Sr., 73, chairman of the board of Parker Rust Proof Co., died recently, at Fort Lauderdale, Fla.

William G. Huseby, assistant sales manager of Kearney & Trecker, died Dec. 28, at Milwaukee, Wis.

Wilbur L. Webb, 51, general manager of the Missile Section of Bendix Aviation Corp., died Dec. 23, at South Bend, Ind.

W. C. Christianson, 50, general sales manager of Trent Tube Co., a Crucible Steel subsidiary, died Dec. 21, at Waterford, Wis.

Lewis P. Kalb, 69, executive vice-president of Gray Marine Div. of Continental Motors, died recently, at Detroit, Mich.

Leland K. Spink, 58, engineer in charge of flow measurement at Foxboro Co., died Dec. 23, at Foxboro, Mass.

Spring steel within this range...

FOR THE MOST EXACTING NEEDS KNOWN TODAY!

• That this is the age of specialization is certainly true in the use of steels. And in this regard *Athenia Steel* customers benefit especially by two not-too-common factors. First, by extreme control of quality and uniformity, unsurpassed, seldom equalled *anywhere!* Secondly, by painstaking technical service to determine or develop precisely the right steel for any special need.

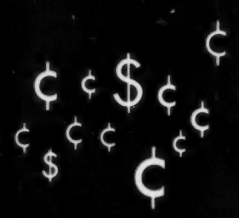
Here at Athenia we concentrate on cold rolled high carbon flat steels, custom made of .45 carbon and higher, in widths from .015″ to 16″ and thicknesses from .001″ to .065″. Full range of finishes and tempers. We also produce special narrow width stainless, and the new super-tough, corrosion resistant spring material, Nilcor*.

For a new and profitable experience in service and in steel controlled precisely to *your* needs . . . try us!

*Trade Mark National-Standard Company

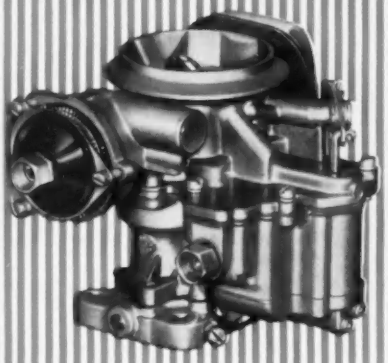
NATIONAL NS NATIONAL-STANDARD Company NILES, MICHIGAN **STANDARD**

DIVISIONS: NATIONAL-STANDARD, Niles, Mich.; *fine wire, stainless, music spring and plated wires* • WORCESTER WIRE WORKS, Worcester, Mass.; *high and low carbon specialty wires*
WAGNER LITHO MACHINERY, Secaucus, N. J.; *metal decorating equipment* • ATHENIA STEEL, Clifton, N. J.; *flat, high carbon spring steels* • REYNOLDS WIRE, Dixon, Ill.; *industrial wire cloth*



Foremost in economy and dependability

STROMBERG



Owner loyalty is the one priceless asset without which no car manufacturer can long survive. Loyal owners become *repeat customers* and the thing that brings them back to the same dealer, year after year, is *performance*. No single component of a car is a bigger factor in performance than the carburetor. That's why it's wise to specify Stromberg*, most reliable and economical carburetor built. The Stromberg Carburetor is built by Bendix-Elmira, first name in automotive fuel systems.

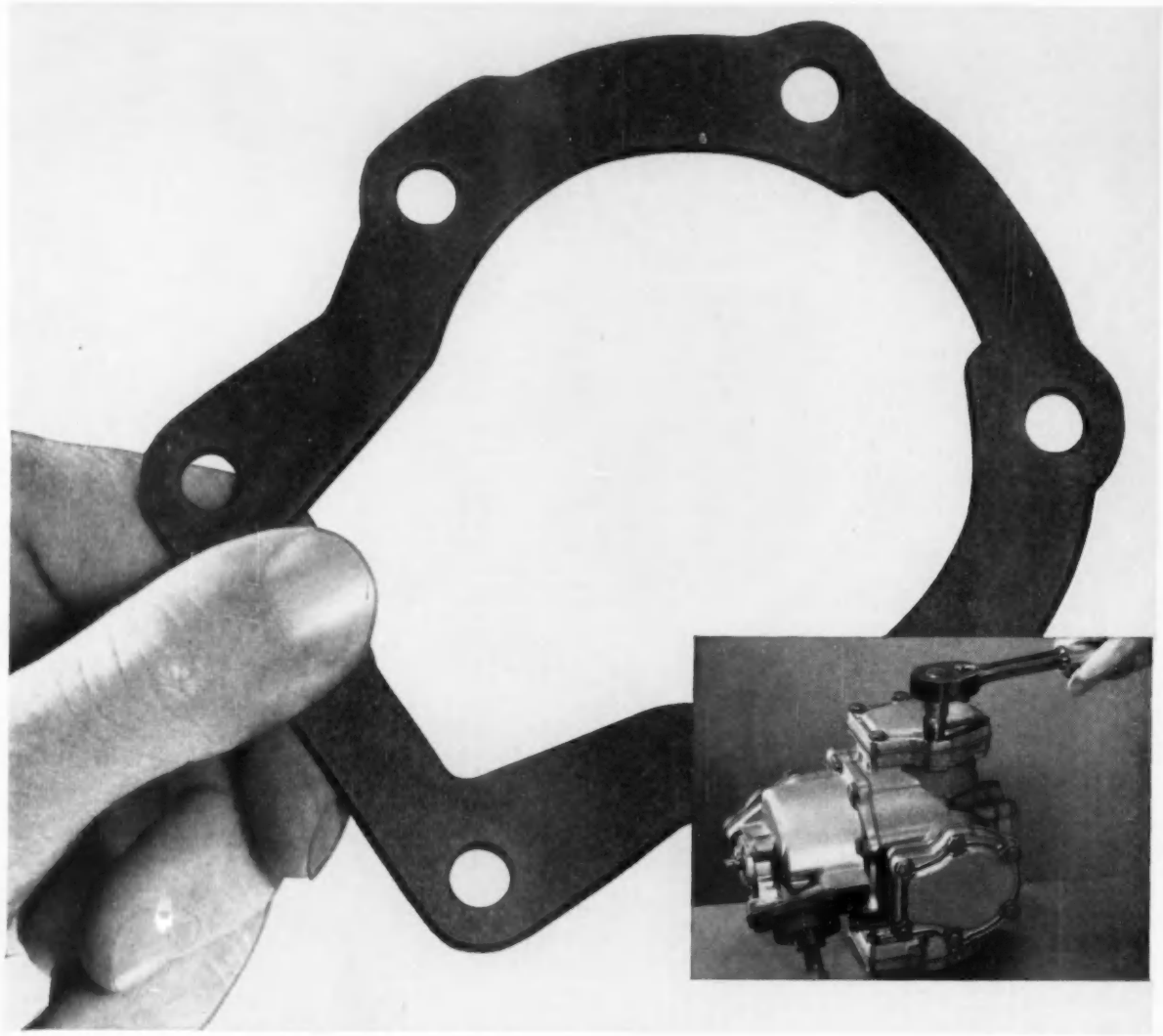
*REG. U. S. PAT. OFF.

HERE'S HOW STROMBERG OUTPERFORMS THEM ALL

- Economical operation, more miles per gallon, happier customers
- Fewer moving parts, fewer mechanical failures, reduced service cost
- Substantially reduced incidence of icing and percolation
- Thin aluminum throttle body and flange for quicker heat transfer

Bendix-Elmira, N. Y.
ECLIPSE MACHINE DIVISION

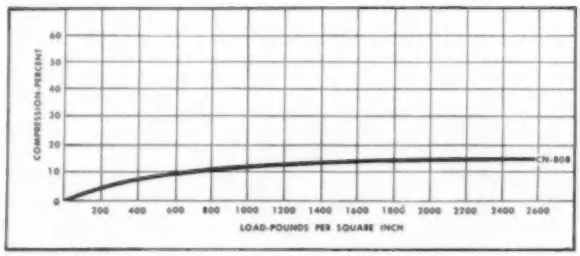
Bendix
AVIATION CORPORATION



Pre-compressed fiber gasket seals lightweight castings at low flange pressure

Armstrong Accopac® CN-808 is particularly recommended for sealing lightweight flanges, such as the light casting used in this gasoline pump metering unit.

With CN-808, there is no danger of flange distortion. You get an effective seal at bolting pressures lower than with any other fiber gasket material—as low as 800 psi. That's because CN-808 is a pre-compressed material. Very little of the bolt torque is used to close the interstices normally found in fiber sheets.

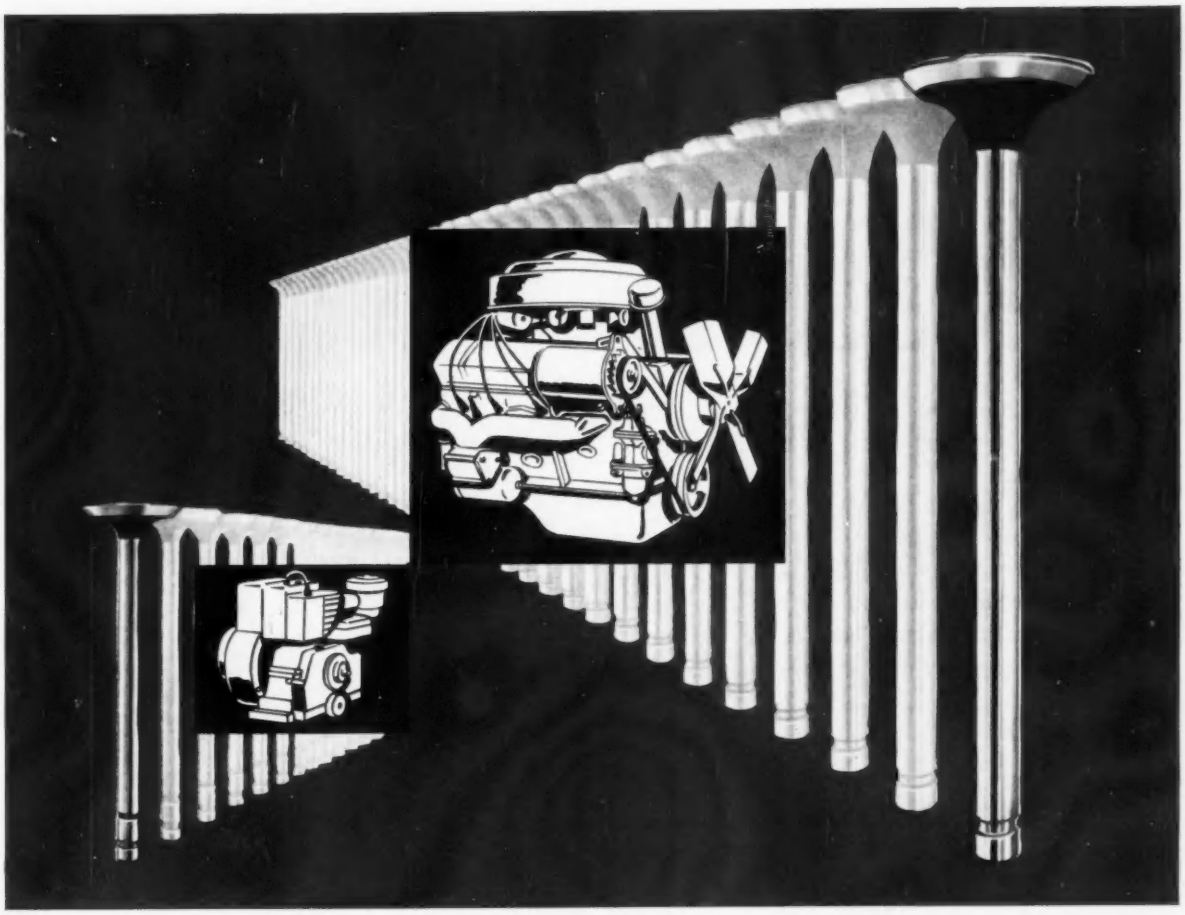


CN-808 is made by the patented Armstrong beater-saturation process, in which cellulose fibers and finely ground cork are combined with a non-volatile latex binder. As a result, it has great crush resistance, plus excellent dimensional stability. The special nitrile-type (Buna-N) binder makes CN-808 suitable for sealing gasoline, light petroleum distillates, or water services.

For more information on Accopac materials, write Armstrong Cork Company, Industrial Division, 7001 Imperial Avenue, Lancaster, Pennsylvania.

Armstrong ACCOPAC

. . . used wherever performance counts



any size engine...any size order...every customer gets red-carpet service at the Valve Division

Some customers of the Valve Division have small requirements... as few as 200 engine valves a month. Others are giants... with monthly requirements as high as 2,000,000 valves.

Some Thompson valve customers build small engines... as small as 1 HP for power mowers. Others build engines up to 2500 HP for industrial applications.

Yet all these customers of the Valve Division have one thing in common... the red-carpet service we strive to give each customer on engineering services, prototype parts, and the delivery of quality production valves.

Valve Division *Thompson Products, Inc.*

1455 EAST 185th STREET • CLEVELAND 10, OHIO

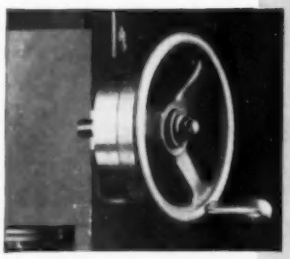
FOOTBURT

Accurate grinding *for small parts*

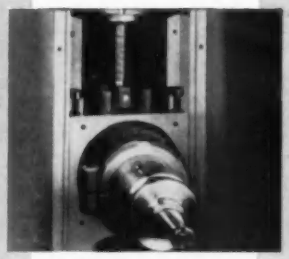
The Hammond No. 2, 6" x 18", Surface Grinder is a precision tool room machine for use on the most accurate gauge and tool work. The standard spindle is direct motor driven and is mounted on precision preloaded ball bearing. Total vertical adjustment is 10¾". In and out movement of table is 6½" with a longitudinal travel of 18".

THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

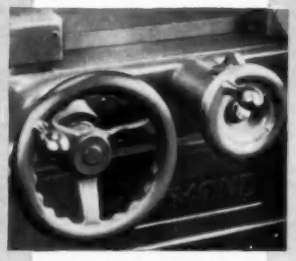
Detroit Office: 24632 Northwestern Highway, Detroit 35, Mich.



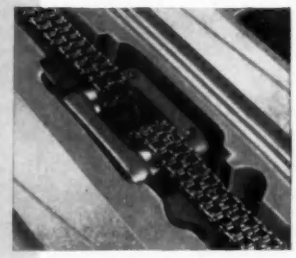
Accurate Spindle Adjustment — Standard vertical adjustment of spindle through handwheel is .0005". With Vernier attachment, spindle can be raised accurately to .00005".



Solidly Supported Spindle Carrier—Spindle carrier is moved vertically on double dovetail ways with adjustable tapered gibs.



Convenient Hand Control — Handy wheels for cross travel, accurately gauged to thousandths, and quick acting longitudinal travel.



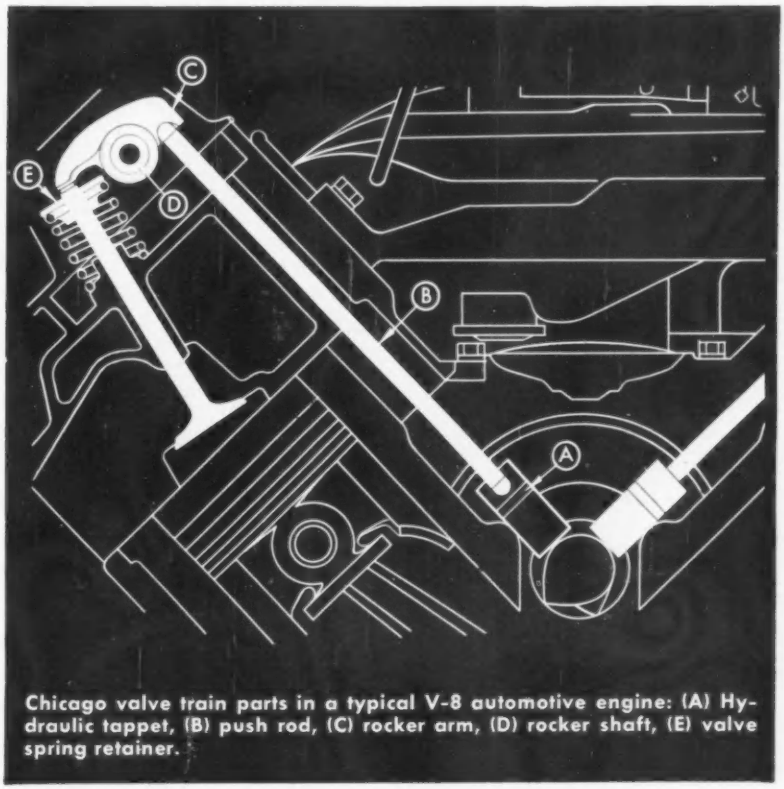
Smooth Roller Chain Table Drive—Remarkably smooth finish on work, without chatter marks frequently found when table is moved by conventional means through rack and pinion.

FOOTBURT

Write for Circular #13A.

SURFACE GRINDING

For all engines - - -



Chicago valve train parts in a typical V-8 automotive engine: (A) Hydraulic tappet, (B) push rod, (C) rocker arm, (D) rocker shaft, (E) valve spring retainer.

Passenger cars

Trucks

Tractors

Diesels

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Everything you need in valve gear

from CHICAGO

Here at Chicago you'll find a single source for everything you need in valve gear. These specialized facilities are solving problems and saving money for leading engine manufacturers . . . and can do the same for you.

Design and Engineering—at Chicago you'll find valve gear engineering experience in depth . . . men who understand your problems and will work with your engineering staff in designing cam shafts and complete valve gear assemblies for any type of engine.

Manufacturing—Chicago is a leading manufacturer of valve train parts. Our complete line includes precision-made hydraulic and mechanical tappets; push rods in both lightweight tubular and solid styles; valve adjusting screws including new self-locking screws that cut assembly costs; valve spring retainers; rocker arms and rocker shafts.

Testing—we have complete laboratory and engine testing facilities.

For the full story of how we can serve you, write our Tappet Division.

THE CHICAGO SCREW COMPANY

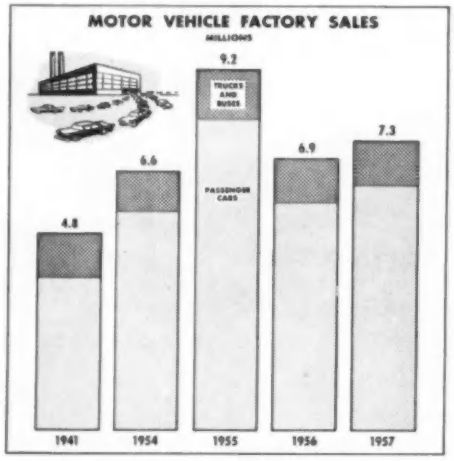
ESTABLISHED 1872 • DIVISION OF STANDARD SCREW COMPANY

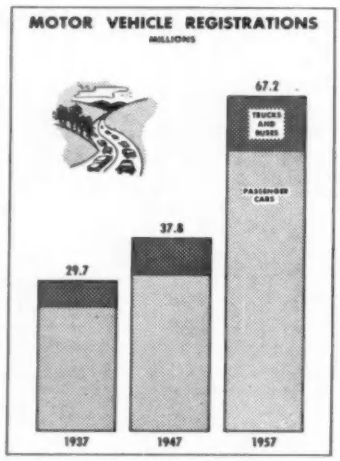
2701 WASHINGTON BOULEVARD, BELLWOOD, ILLINOIS

Passenger Car Sales This Year Expected to Total About Six Million Units as 1955 Buyers Return to Market. Labor Contract Negotiations and Level of Economy in General Are Question Marks in the Picture

Automotive Forecast for 1958

By Hugh Quinn





THE year 1957 as a whole will be recorded in the chronicles of the automobile industry as one much like any other. However, there were some developments in certain areas that give it a distinction all its own.

The past year did not set any outstanding industry-wide production records, although the total of some 7.2 million motor vehicles did surpass the 1956 total by a comfortable margin. Automobile output passed the 6 million mark for the fourth time in history in reaching approximately 6.1 million cars. Truck and bus production totaled about 1.08 million units, some 24,000 below 1956.

But, needless to say, there is much more to the story than just overall production figures. Production in reality is the result of consumer buying trends, and twice during 1957 the automobile market fooled the forecasters.

The industry entered the year optimistically in estimating sales of over 6 million cars. But by winter's end, the forecasters had revised their figures downward to about 5.8 million cars. It soon became apparent that a change in buying habits seemingly had eliminated, for the second straight year, the historic spring market upturn.

Then, as the 1958 models were being announced to the press and the public, automobile company officials renewed their optimism. They foresaw (or at least hoped for) a strong finish in 1957 spurred on by the new models, and a market ranging from 6 to 6.2 million cars in 1958. However, the 1958 models did not meet as high an immediate sales response as had been anticipated, and in the closing week of the year several manufacturers cut their production schedules because of mounting inventories of unsold cars.

Outlook for the Year Ahead

Thus, 1958 is being approached conservatively. The general feeling is that passenger car sales, including imports, will total around 5.8 to 6 million units. Foreign car sales in this country may reach 300,000 units. Truck production could receive a favorable impetus from increased activity in the Federal roadbuilding program. Despite a start somewhat slower than expected, 1958 might end up at a faster pace to raise the average level of business slightly above 1957. The curtailed first-quarter activity migh precede a renewal

of the formerly traditional spring upturn in automobile sales.

The new year will find two important factors influencing sales and production. One could help the automobile industry, the other could hurt it. Both elements are currently evident on the horizon, although their ultimate significance cannot be predicted now.

On the favorable, or optimistic, side is the fact that most of the credit buyers who spurred the record-buying boom in 1955 will be in a position to buy again during 1958. Each year there are car owners re-entering the market as they pay off notes, but for the coming year there are additional motorists who should be ready to trade their 1955 models. Estimates have placed the number in this bonus group as high as 900,000 persons. Also, the 7.2 million passenger cars sold at retail during 1955 are now at the "tradeable" age of three years.

On the less favorable side, perhaps, is the fact that United Auto Workers' contracts with the automobile companies are due to expire in mid-1958. A major strike against one of the Big Three could seriously affect the industry's performance in both production and sales. Even if there is no strike, the contract negotiations and the threat of a strike could have a bad psychological effect on the market. Negotiations will begin around the end of March and could stretch out for two months or longer.

Highlights of 1957

During 1957, automobile production workers received cost-of-living and annual improvement increases totaling 12 cents an hour. This brought the average production wage for 1957 to $2.50, the highest in history. There were, on the average, 652,000 persons employed in the nation's automobile plants, plus another 163,500 nonproduction workers. The payroll for motor vehicle production workers totaled $3.33 billion.

The wholesale value of passenger car, truck, and bus production last year totaled nearly $14 billion, an increase of $2 billion over 1956. Replacement parts and accessories sales had a wholesale value of $1.85 billion.

Automobile ownership rose to 75 per cent of all families, according to the Automobile Manufacturers Association. The number of families owning cars increased by 3 million to 39 million. More than 13 per cent of all families owned more than one automobile. Registrations at the end of the year were estimated at 67,231,000 passenger cars, up nearly two million since 1956.

Vehicle mileage during 1957 rose by nearly 22 billion miles to a record 650 billion, and gasoline consumption increased from 50.1 billion gallons in 1956 to 51.5 billion gallons. Special motor vehicle taxes during the year totaled approximately $10.5 billion.

Although 1957 did not distinguish itself on an industry production basis—certainly not the way 1955 did with its 7.9 million passenger cars—the year did contain some important individual company events. In addition, there were some significant product and plant developments.

For instance, there's the Edsel story. After some nine years of study and planning, three years of actual product development, and months of astute public relations and publicity, the newest Ford Motor Co. car was unveiled.

The public was well prepared for the Edsel. Photographs of the car with the unusual grille had "leaked" to the press back in the Spring. Nearly every consumer magazine carried some sort of "dope" story in advance of the announcement date, Sept. 4. The division hoped for first-year sales of 200,000 cars.

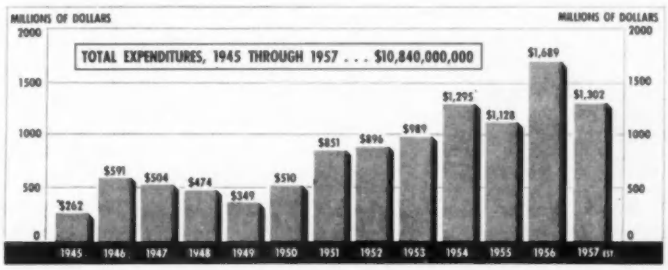
Edsel, however, soon found it was bucking two strong factors of sales resistance—the keenly competitive model close-out campaigns of the other makers and the 1958 price structure of its product. Sales did not meet expectations. Edsel registered 11,655 cars in September, 7601 in October, and no marked improvement was noticed in November.

By the end of the year, Edsel had produced only 55,000 cars and the daily rate had dropped below 100 units during most of the closing weeks. It should be pointed out, though, that any new product takes time to win public acceptance. Edsel Div. officials believe that sales volume will increase as the car becomes more familiar to the buying public.

While the name of Edsel was being added to the roster of automobiles, two well-known and venerable names were consigned to the archives. Nash and Hudson became brands of the past when American Motors Corp. decided to

(*Turn to page* 154, *please*)

Expenditures for New Plants and Equipment



INDUSTRY REVIEWS and PREVIEWS

STEEL IN SPITE of temporary setbacks, steel output in the U. S. will increase over the long term because of the nation's steady growth. Max D. Howell, executive vice-president of American Iron and Steel Institute, states that production in the next year may total 110 million net tons of ingots and steel for castings. Only four years, including 1957, have had an annual output higher than this figure.

The 1957 production approximated 113 million tons and was the third largest total in history, although operations receded slowly during the year from record high levels. With the high output of 1957, the steel industry succeeded in making more than one billion tons of raw steel during the past 10 years.

In all probability, Mr. Howell continues, the national steelmaking capacity will increase to a record high level, effective at the start of 1958. Thus, the same amount of production as in any previous year will reflect a lower percentage rate of operations than formerly. A striking example of this difference is as follows: In 1957 an operating rate of 85 per cent of capacity produced over eight million tons more steel than an average of 100.9 per cent of capacity in 1951.

According to the American Iron and Steel Institute's best indicator of steelmaking activity, the 1957 output was about 130 in terms of the basic index of average production for the period 1947-1949. The annual steelmaking capacity was nearly 133.5 million net tons at the start of 1957—a gain of more than 42 million tons since the end of WW II.

More than $9 billion has been spent by steel companies for new equipment and construction since the end of WW II. Additional large-scale expansions will be required in future years.

The iron and steel industry's total payroll in 1957 reached $4 billion for the first time. The previous record was $3.8 billion set in 1956. These figures cover wage and salaried employes directly engaged in the making and sale of iron and steel, but do not include employes in other activities.

Steelworkers' average hourly earnings during 1957 averaged over $2.90, or over 20 cents per hour more than during 1956, when the former high of $2.70 per hour was set. In the later half of 1957, hourly employes' earnings reached an average of $3.00 an hour.

Scientific and technological progress went forward at a greater rate than ever before. The use of oxygen to hasten steelmaking process increased. Research was intensified on the direct reduction processes for producing metallic iron directly from certain kinds of high grade ore.

Raw materials activities included the widening of iron ore explorations, the further development of taconite and other low grade ores, and the rapid growth of sintering facilities which convert fine and low grade iron bearing materials into economically usable ores.

Steel mills and foundries used less scrap to make new steel and castings in 1957 than in 1956. However, according to Edwin C. Barringer, executive vice-president, Institute of Scrap Iron & Steel, demand from friendly foreign nations was somewhat larger.

About 35.6 million gross tons of iron and steel scrap passed through the hands of processors and brokers or moved directly to mills during 1957, compared with approximately 40 million tons in 1956. The total consisted of about 30 million tons of purchased scrap destined for steel mills and foundries in this country and 5.6 million tons of licensed exports.

As far as 1958 is concerned, Mr. Barringer feels that while scrap demand may be down somewhat in the early part of the year from that of late 1957, the last half of the year will show some improvement. Thus, the year as a whole may well wind up little changed from 1957.

- Steel
- Stainless Steel
- Aluminum
- Copper
- Brass
- Nickel
- Metallurgy

- Rubber
- Petroleum
- Plastics
- Road Building
- Material Handling
- Construction

STAINLESS STEEL

STAINLESS steel mill shipments last year were somewhat below the near-record level of 1956, according to the Committee of Stainless Steel Producers, American Iron and Steel Institute. Through the third quarter—the latest period for which figures are presently available—the industry shipped 490,195 tons of mill products, as compared to 494,492 tons during the year before.

The automobile industry is the largest single user of stainless steel, and 1957 saw increased usage of stainless for car production. Through the third quarter, 76,757 tons were shipped to automotive manufacturers and independent suppliers, as compared to 70,044 tons in the previous year, a gain of close to 10 per cent. Of the total stainless shipped, 70,932 tons was cold rolled strip, roughly 50 per cent of the industry's production. Indications are that the use of stainless steel by the automobile industry will continue to increase during the coming year, due to the use of larger amounts per car on many 1958 lines.

Shipments for appliances, aircraft, electrical and industrial machinery and other purposes were off to varying degrees last year. This decline was offset in part by increased shipments to warehouses and distributors, which accounted for a total of 169,461 tons through the third quarter. This very substantial share of stainless mill shipments was widely distributed among numerous industries.

The largest single user of warehouse stocks was the aircraft industry, which accounted for 9.3 per cent of warehouse shipments. As an industry, aircraft accounts for the second largest usage of stainless steel.

Major strides were made during 1957 in the use of stainless steel for aircraft construction. The B-58 supersonic bomber, for example, uses substantial amounts of stainless steel sandwich panels to overcome the problems caused by heat from air friction and engines. New techniques for panel construction are being investigated, and the use of stainless alloys in aircraft is expected to increase steadily.

During the past year, chromium—nickel—manganese stainless steels (Types 201 and 202) were produced in larger quantities. Indications are that these alloys are finding increasing acceptance by users of austentic stainless steel.

ALUMINUM

THE year 1957 was the third successive one in which primary aluminum production in the U. S. was more than 1.5 million tons. In addition, according to Donald M. White, secretary of the Aluminum Association, 1957 was notable as a year during which ample supplies of aluminum were available for civilian uses.

According to Bureau of Mines statistics, imports of bauxite for U. S. consumption were 11 per cent higher for the first half of 1957 than for the same period in 1956, while the material from U. S. bauxite mines was down 23 per cent. In August, 1957, the basic aluminum pig price advanced one cent per pound over the 1956 price to reflect increased labor and material costs.

In all classes of product fabricating—rolling, extruding, drawing, forging and casting—facilities were expanded during the year. Most new installations were made in or near growing marketing areas.

Building materials and transportation led the field of civilian uses for wrought aluminum products. There was growing interest in and demand for aluminum for private homes and schools.

Further integration of aluminum into the design of 1958 cars was proof of a healthy market in the automotive class of applications. The automobile industry continued to lead as the largest user of the light metal in cast form (including die castings). Where 1957 models used 14.3 per cent more aluminum than in the preceding year, the average 1958 model uses 28.6 per cent more aluminum than was used in the 1956 cars. Average total weight in 1958 cars in 45 lb, although some de luxe models use as much as 200 lb of aluminum.

The boating and electrical appliance industries likewise continued to gain as important users of aluminum. Substantial advances in the field of packaging were also made during the year, when production of aluminum cans for use in packaging motor oil, food products, and welding rod was begun.

Several new alloys were introduced for broadened utility in the aluminum family of materials. One employs the rare earth element, lithium, for high-strength, high-temperature applications in jet aircraft. A new casting alloy was announced for cast shapes for missile and aircraft structures.

Further developments were also made in high-strength, weldable alloys for marine and materials-

handling applications. For extruders, particularly those concerned with automotive trim, a new "high finish" heat-treatable alloy was announced. Several new alloys for applications in the atomic energy field were also developed.

COPPER AND BRASS

THE year ahead holds both promise and problems for the nation's copper and brass mills, according to T. E. Velfort, managing director of the Copper & Brass Research Association. These mills produce copper, brass, bronze, nickel silver, and other copper alloys in the form of tube, strip, sheet, rod, mechanical wire, plate, various shapes, and forgings.

Among encouraging aspects of the 1958 picture are the predicted upturn of some six per cent in residential building and an equal or greater percentage of gain in modernization and remodeling of existing structures. Both fields are major markets for brass mill products.

A forecast of increased volume in the electronics industry during 1958 also is heartening, as is predicted sales recovery in the electrical appliance field.

The automobile industry, of course, is one of the mills' important markets. Certain models of the Edsel are using up to 59 lb of copper and brass.

The problems facing the brass mill industry in the months ahead stem chiefly from the current general downturn in many segments of the economy and from the growing volume of imported brass mill products. The downturn has found many important brass mill customers content to operate with low inventories, confident of immediate delivery when needed because of abundant brass mill capacity. This means that the mills, which consume 40 to 45 per cent of all domestically produced new copper, must keep large stocks of copper on hand, even when immediate business orders do not actually warrant it.

The gravity of the import threat can be appreciated when it is realized that brass mill products are coming into the U. S. at a current rate of more than 100 million lb per year. In terms of earnings loss to American brass mill workers, this adds up to fifty 40-hour weeks for 1500 men.

The year 1957 saw shipments of brass mill products dip about 10 per cent from 1956. Comparative totals were 1.8 billion lb for 1957, against 2.0 billion for 1956. The 1956 total was approximately 12 per cent under 1955's shipments of 2.28 billion lb.

Chief reasons for the decline in 1957 shipments were: limited buying by important customers, such as those in the automotive and appliance fields; a continued lag in housing starts; and the growing volume of imports.

In the expansion and improvement of their facilities, the brass mills are forging ahead rapidly. Typical examples of enlargements and modernization by member companies of the Copper & Brass Research Association include new tube and rod mills, a research center, electronic heavy-duty plating equipment, an analytical control laboratory, and a 200-ft roller hearth annealing furnace.

NICKEL

THE year 1957 brought a turnabout in the supply-demand situation for nickel, according to Dr. John F. Thompson, chairman of the board of International Nickel Co. of Canada, Ltd. The combined supply of market and premium price nickel came into close balance with demand in nearly all areas of the world during the last part of 1957.

In fact, in the largest market (the U. S.), supply exceeded the demand. Stocks in U. S. customers' inventories were estimated to be 25 million lb greater at the end of 1957 than in 1956. There was also an accumulation in the hands of the Government of a large supply of unsold Government nickel diverted from stockpile.

Free World nickel supplies in 1957 were estimated at 490 million lb, compared with the previous high of approximately 450 million lb in 1956. An estimated 60 per cent of the total was delivered to the U. S., with about 40 per cent going to Canada, the United Kingdom and other countries of the Free World. Instead of 40 per cent of the total being consumed by defense and stockpiling requirements, only about 20 per cent was wanted for these purposes in 1957.

The steel industries of the world continued during 1957 to constitute the largest markets for primary nickel, principally for the production of stainless steels, engineering alloy steels, and jet engine alloys.

Production of nickel-containing stainless steels in the U. S. during 1957, occasioned by reduced defense requirements, was less than the all-time record high established in 1956. However, the nickel-containing types accounted for a greater percentage of the total stainless steel output during 1957 than for any year since 1948. Requirements for nickel-containing stainless steels continued high in all fields with greater amounts employed for structural parts in military aircraft and missiles.

The amount of nickel consumed by the U. S. steel industry in the production of nickel-containing engineering alloy steels in 1957 was approximately the same as in 1956. Major markets were automotive vehicles, aircraft, military equipment, farm machinery, roadbuilding equipment, and components for the railroad and petroleum industries.

Despite increasing competition from other metals, nickel-plating continues in demand for decorative and engineering applications. Its use as decorative trim, especially by the automotive and home appliance industries, rose in 1957. Nickel usage in 1958 by the automobile industry is expected to increase considerably from an average of five pounds per car as plating thickness rise and richer alloys become available.

Notable advancements have been made in the use of electro-formed nickel for intricately shaped corrosion and heat-resistant components of missiles and jet aircraft. Increased interest is being shown in the use of relatively thick nickel deposits on industrial processing and transportation equipment to prevent product contamination.

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Aircraft Industry Enters 1958

with High Backlog of Missile and Commercial Plane Orders

THE year 1957 was probably the most extraordinary in the history of the aircraft manufacturing industry. As the Aircraft Industries Association points out in a year-end statement, the industry has always been exposed to rapid changes in its levels of activity, sales, and products; but in 1957, changes came with unprecedented frequency and impact.

Sales were estimated at $11.5 billion, compared to $9.5 billion in 1956, despite the fact that employment was reduced from 900,000 persons at the beginning of the year to 800,000 by the year's end. In addition, there were widespread contract cancellations and cutbacks, both in the activities of the prime contractors and in those of subcontractors and suppliers, and many plants were closed.

Review of • 1957 •

As the year 1957 began, the industry was on a relatively high and stable level of operations which had been in existence for some four years. At the same time, it was reorganizing its work forces and facilities in anticipation of a rather substantial change in the type of products it was manufacturing. Early in the year, it had been expected that aircraft production would gradually decline over the next three years and that this decline would be offset by a substantial increase in the deliveries of guided missiles.

By mid-year, as a result of a fiscal crisis in the Federal Government, the orderly program of transition was scrapped. Through a series of directives from the Defense Dept., contracts were stretched out, programs were cancelled, and severe limitations on over-time, progress payments, etc., were imposed.

Simultaneously, the industry was called upon to finance an even greater part of the work it was performing for the Government. Later in the year, the Russians announced a successful launching of an ICBM and put into orbit two earth satellites. There was immediate public reaction and concern over the lack of progress made by the U. S. in these fields.

As a result, many of the previously imposed restrictions were removed, and programs to accelerate American activity in the fields of guided missiles and space technology were initiated. At year's end, the detailed impact of these programs could not be ascertained; however, it appeared that there would be a sharp increase in production of guided missiles and in research and development.

A decline in volume of military aircraft production from some 6800 units in 1956 to over 5000 units in 1957 was more than offset by the increased activity in the missiles field and by increased deliveries of commercial aircraft. Commercial sales for the first time in history topped the $2 billion mark, up more than $500 million from the 1956 figure.

Although dollar volume of sales was the highest since World War II, much of this can be attributed to the influence of inflation. For example, the aircraft materials price index averaged 152, compared to 109.2 in 1950; and average hourly earnings were $2.35, compared to $2.27 in 1956, even though the average work week was 40.5 hrs in '57 against 42.1 in '56.

The impact of contract stretchouts, cancellations, and other economic restrictions placed on the industry, while not significantly affecting sales, had a material effect on earnings. For example, during the first nine months of 1957, the 12 major airframe companies reported an increase in sales of more than a billion dollars from a 1956 figure of $3.8 to $4.9 billion. Earnings only increased from $112.6 million to $120.1 million for the same period.

The unusual changes in military orders and programs radically affected fourth quarter figures, although it is impossible to forecast accurately yet the complete year's earnings. However, it is safe to assume that the rate of earnings to sales will not be improved over the nine-month rate.

At the end of the third quarter of 1957, the total backlog of unfilled orders was $14.4 billion, compared to $18.4 billion in 1956. Of this total, approximately $3.9 billion was represented by orders for commercial aircraft.

It is pertinent to note that the proportion of commercial business has been steadily increasing over the past few years. In 1955, military sales represented 89 per cent of total sales; in 1956, they were some 85 per cent of the total; and in 1957, military sales represented an estimated 82 per cent of total sales. It is expected that this trend will continue in 1958.

Prospects for • 1958 •

SALES for 1958 are expected to continue high and run well over the $10 billion mark. This continued high level of sales will

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Simplified Storage System for Semi-Automatic Tooling

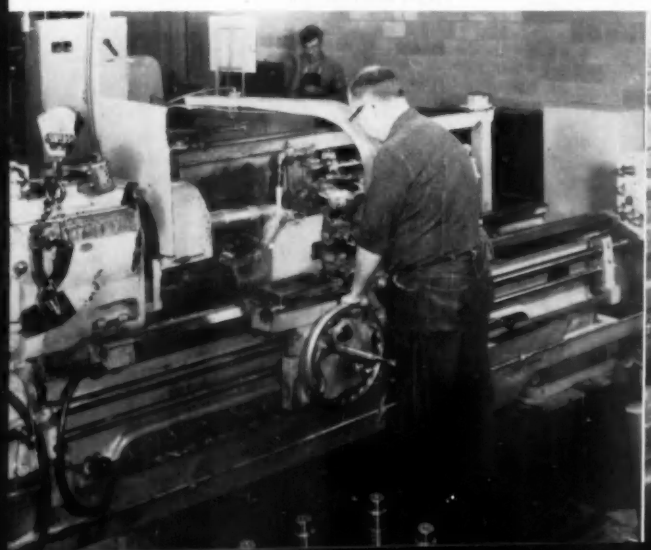
By Kenneth Rose

THE matter of storing and preserving tools for parts for which there is little demand, but which must be supplied when ordered, is a difficult one in the high-production industries. The problem of service is not too difficult where only a few models are manufactured. However, in the construction equipment industry the situation is complicated by the fact that there may be several models of a certain part having representation in machinery still in service. The supplier of parts to the industry must maintain tooling for production of all the models used by each of his customers, even though the demand for parts of any one model may be very small.

Typical of this situation is a power take-off unit supplied by Twin Disc Clutch Co., Racine, Wis., to manufacturers of construction equipment and others. The unit is simple in design, consisting of a gray iron bell housing containing a clutch on a steel shaft with a pilot bearing at the input end and a main bearing toward the output end. Between the bearing locations is the tapered portion of the shaft. On the output end of the shaft, beyond the main bearing, the customer may specify special dimensions to suit his own requirements. Because the portion of the shaft inboard from the main bearing is standardized to fit the clutch, Twin Disc designates this as the clutch end, while the output end, for which the customer may specify dimensions, is called the customer end. There are about 150 shaft models based upon the standardized clutch end alone.

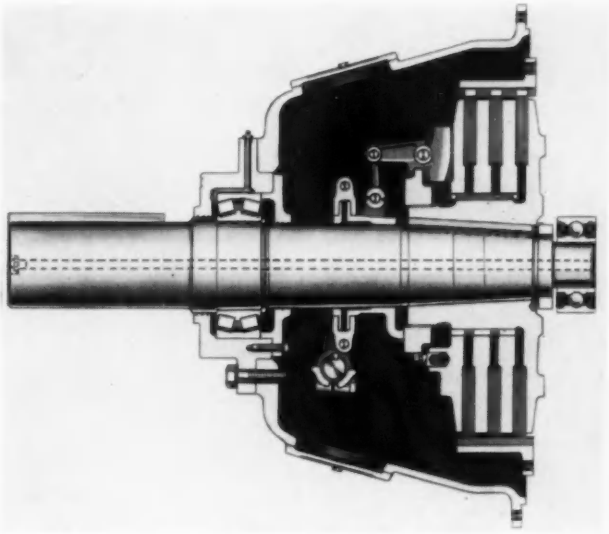
While it is desirable to have semi-automatic production so as to keep machining costs at a minimum, it is obviously impossible to set up elaborate production methods for each of the 150 shaft models. Shafts may

The company end is turned down to dimensions set by a profiling template



Programming lathes follow a sequence of turned and tapered surfaces automatically

TWIN Disc Clutch Co. Has Efficient Setup for Storage of Tooling and for Production of Replacement Components in Limited Quantities. Use of Heat Treated Bar Stock as Raw Material for Shafts Reduces Costs of Heat Treating, Cleaning, and Straightening



Cutaway view of the power take-off shaft and housing

be made to fill orders for one or two pieces, or in lots of 25 or more. The production system setup involves the use of either of two types of profiling lathes to machine pretreated steel bar stock. The turning operations are controlled by a template in the lathe. The templates are clamped in position and are so accurately located that the machining of several models in succession involves only a few minutes of setup time for changing templates.

The first production step is the selection of the material. The shaft must possess great toughness, with wear resistance at the journals. In order to get these properties without installing elaborate heat treating equipment, steel is purchased heat treated in the bar. This is C 1144 steel, mill heat treated to 229-269 Brinell. In manufacturing a standard A5189 shaft, the bar steel is cut into 27⅝ in. in length with a power saw. The next operation is facing and centering, done automatically on a centering machine.

If there are less than 10 pieces in the lot to be made, they are next taken to a pair of conventional profiling lathes. The correct templates are clamped in place on the lathe, and the clutch ends of the shafts are turned down to the template size. Customer ends are turned to a standard size, or to the customer's own specifications. These lathes are used also for those shafts in which the customer has specified an unusual length that cannot run in the multicycle profiling lathes. These latter lathes are 42 in. between centers compared with the 72 in. center-to-center distance on the conventional machines. After the turning operation, the shaft is handled the same as with the larger lots.

When the lot consists of 10 or more pieces, it is

Keyways are milled two at a time; the machine can also be set up for three shafts

Pilot bearing journal is hardened by induction heating to provide a skin hardness of Rc 55

taken to the multicycle profiling lathes. These lathes have a programming system that makes five cycles automatically. The clutch end of the shaft is completed in these five cycles. Metal is removed at the rate of approximately 14 cu in. per minute.

Machining is done with carbide throwaway insert tool bits, shaped triangularly, and having three cutting edges along each side . . . six in all. These throwaway cutting tools are clamped in a tool holder and, as they are lapped to within 0.002 inch of their nominal size, the tool bit can be rotated or reversed in the holder without repositioning the machine. The lathes are powered with 25 hp, variable speed, d-c motors. The motor allows the lathe to maintain a constant surface cutting speed range over a 4 to 1 ratio.

The customer end of the shaft is turned on automatic lathes in which limit switches control the travel of the feed and crossfeed, so that when the limits have been set, the cycle will repeat itself for each succeeding piece until the controls are reset.

Next, the keyways are milled in. The miller can be set to take either two or three shafts at a time. Many of the users specify special-sized keyways, which require a special machine setup.

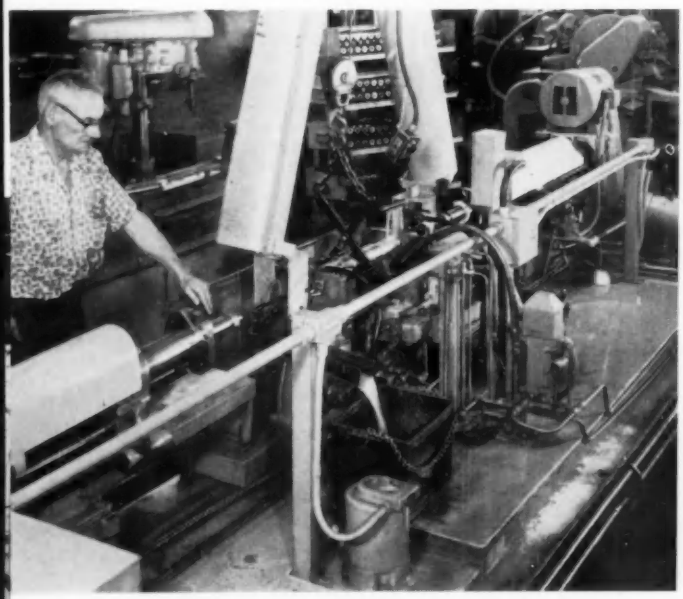
The journal for the pilot bearing, at the input end of the shaft, is hardened by induction heating to provide a skin hardness of Rc 55. The entire shaft is then finish ground on regular cylindrical grinders, in which the rough and finish grindings follow each other over the surface in the same setup. Air gages control the amount of stock removed automatically. From 0.010 to 0.015 in. of stock is left on the shafts for grinding. Grinding tolerances are held closely to comply with standard bearing tolerances as recommended by bearing manufacturers.

The shafts are now placed in a deep-hole drilling machine in which a hole is drilled through the entire

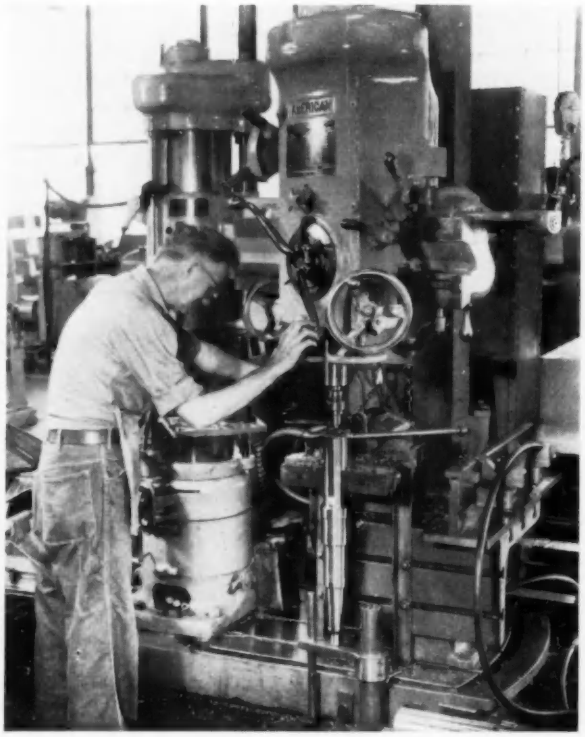
(*Turn to page* 144, *please*)

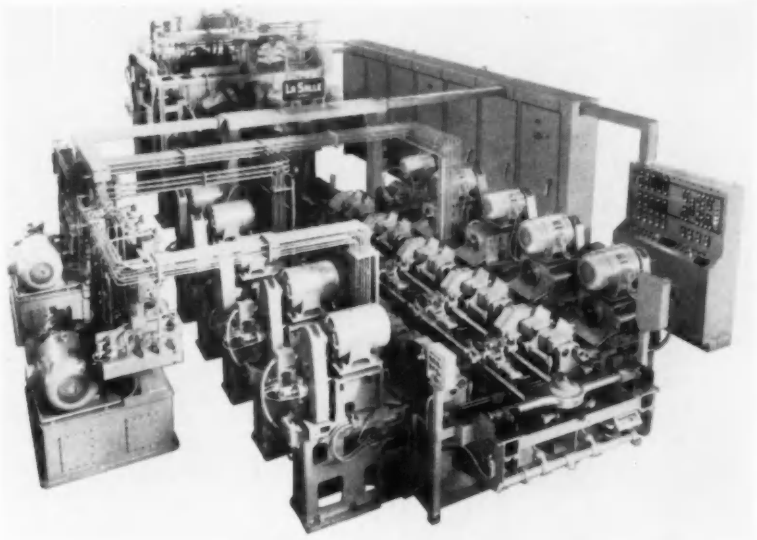
Grinding is controlled automatically by air gages

A hole is drilled through the entire shaft to supply grease to the pilot bearing



The shaft is tapped for attachment of a grease fitting





This is an overhead perspective view of one of the LaSalle transfer machines described in the text. This photograph was taken on the erection floor prior to shipment to Chevrolet, hence shows more detail than is possible when the equipment is installed in the machine shop.

New Transfer Machines for Chevrolet Rear Axles

WITH the introduction of its 1958 line of passenger cars Chevrolet has made some detail changes in the rear axle housing, primarily to provide for the new optional air ride mounting. As illustrated in the 1958 Chevrolet announcement (see AI, Nov. 1, 1957), the rear suspension now incorporates two trailing arms and a rear stabilizer. To accommodate this change in mounting, the conventional spring pads have been eliminated. In their place there are two lower mounting brackets welded to the front of the rear axle housing; and one upper arm bracket welded at the rear for the stabilizer hook-up.

These changes made it necessary to discard the previous method of machining at the Chevrolet Gear and Axle plant and have brought about the adoption of three unique transfer machines built by LaSalle. Each of these machines is of 13-station construction and tooled primarily for machining the housing ends and the drilling and reaming of mounting holes in the three brackets. The transfer machine is uniquely suited to this kind of processing since it is of major importance to have the reamed holes in proper alignment with respect to the axes of the housing.

As illustrated, the transfer machines are fully automatic in operation, require operators only for loading and unloading. At the loading end, an operator removes a housing from the monorail conveyor serving the three machines and loads it onto the first station fixture. From this point on the sequence through the machine is completely automatic.

The sequence of operations through the LaSalle machine can be summarized as noted in table.

It may be noted that stations 1 to 8 inclusive are double-end horizontal units; while stations 9 to 12 inclusive are the tall vertical heads at the rear end.

Looking at the tooling of individual stations, the setup at Stations 2 and 3 is similar with large heads at each end for boring, turning and facing. Each one is fitted with four Wesson cemented-carbide tool inserts.

Station	Operation	Speeds RPM	Feeds IPM
1	Load		
2 RH & LH	Bore, turn, and face head, cross face head	500	7.00
3 RH & LH	Bore, turn, and face head, cross face head	500	7.00
4 RH & LH	Form radius and chamfer-two diameters in the head (8-tooth cutter for forming)	85	3.24
5 RH & LH	Ream bearing diameter (8-tooth cutter)	46	3.24
6 RH & LH	Drill four, 0.391 in. holes in both ends	684	4.10
7 & 8	Idle		
9	Bore holes in the two lower control arm brackets	393	3.93
10	Bore holes in upper control arm bracket (special 4-flute combination core drill and reamer)	180	7.0
11 RH & LH	Deburr lower control arm brackets	490	5.88
12	Pierce holes in lower control arm brackets		
11 Center	Chamfer upper control arm bracket	220	1.32
13	Unload		

Tooling at Station 9 represents a critical situation which requires extremely accurate positioning of the special two-flute drills. The hole is drilled at an angle of 22-deg to the horizontal and must drill through a specified reference point.

The lower control arms have two flanges; only the inner flanges on each side requiring accurately

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The F-1000, one of the new conventional models

Ford's Heavy-Duty Trucks with All-New

THE line of Ford heavy-duty and extra-heavy-duty trucks being launched this month is replete not only with noteworthy chassis features, but highlights three big heavy-duty engines with displacements of 401-, 477-, and 534-cu in.

The new line offers high performance characteristics with the availability of the big engines. It includes 10 models: *Conventional*—F-850, F-950, F-1000, F-1100—with GVW ranging from 25,000 to 36,000 lb and GCW from 50,000 to 65,000 lb. *Tilt Cab:* C-850, C-950, C-1000, C-1100—with GVW ranging from 26,000 to 36,000 lb and GCW from 50,000 to 65,000 lb. *Tandem Axle Models:* T-850 with GVW of 43,000 lb and 45,000 lb optional, and GCW of 70,000 lb; T-950 with GVW of 46,000 lb and 51,000 lb optional, and GCW of 75,000 lb.

The new engines are distinctive in design, employing the wedge-shaped, fully-machined type combustion chambers which made their appearance for the first time this year in a number of passenger car engines. This design eliminates the usual combustion chamber cavities in the cylinder head, leaving the gasket face flat and fully machined. The top of the cylinder banks on each side is machined plane at an angle of 13-deg with respect to the axis of the bores, forming the combustion chamber configuration in combination with the stepped piston.

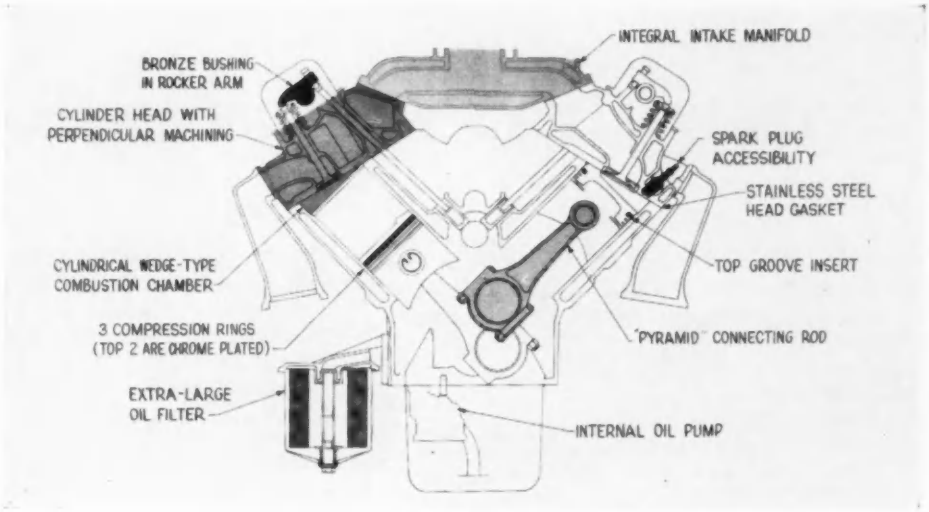
The aluminum alloy piston is cast with a step to provide for the quench and squish area. It employs a four-ring setup, consisting of three compression rings and one oil ring. The top ring groove has a cast iron top ring groove insert to reduce wear of the groove, and the top ring and oil ring are chromium plated.

Exhaust valves are sodium-cooled, operate in integral valve guides, and are Stellite faced. Both exhaust and intake valves operate in inserted valve seats, and are fitted with positive rotators. Intake valves are of "tulip-type" with head material of high nickel-chromium steel.

Cylinder heads have the exhaust valves staggered so that none is adjacent to another, thus reducing temperature. Spark plugs are located above the exhaust manifolds for easy accessibility. Heads are secured by means of 10 high tensile steel bolts, equally spaced about each bore. Stainless steel gaskets with an aluminum plastic coating

1958 FORD TRUCK HEAVY DUTY ENGINES
OHV V-8 (FIVE MAIN BEARINGS)

	401 V-8	477 V-8	534 V-8
Bore (in.)	4.125	4.5	4.5
Stroke (in.)	3.75	3.75	4.2
Displacement (cu in.)	401	477	534
Compression Ratio	7.5 to 1	7.5 to 1	7.5 to 1
Bhp (max.)	226 @ 3800 rpm	260 @ 3800	277 @ 3400
Bhp (net)	190 @ 3600	244 @ 3400	246 @ 3200
Torque (lb ft) max.	350 @ 1600-2300	430 @ 1600-2300	490 @ 1600-2300
Torque (net)	330 @ 1600-2100	416 @ 1600-2000	474 @ 1600-2100
Truck Models (std. eqpt.)	F, C, T—850, 950	F & C 1000	F & C 1100
Truck Models (opt.)	.....	T-950 & 950	T-950 & 950


INTEGRAL INTAKE MANIFOLD
BRONZE BUSHING IN ROCKER ARM
CYLINDER HEAD WITH PERPENDICULAR MACHINING
SPARK PLUG ACCESSIBILITY
STAINLESS STEEL HEAD GASKET
CYLINDRICAL WEDGE-TYPE COMBUSTION CHAMBER
TOP GROOVE INSERT
3 COMPRESSION RINGS (TOP 2 ARE CHROME PLATED)
"PYRAMID" CONNECTING ROD
EXTRA-LARGE OIL FILTER
INTERNAL OIL PUMP

Details of the 1958 Super-Duty truck engine

Big Engines

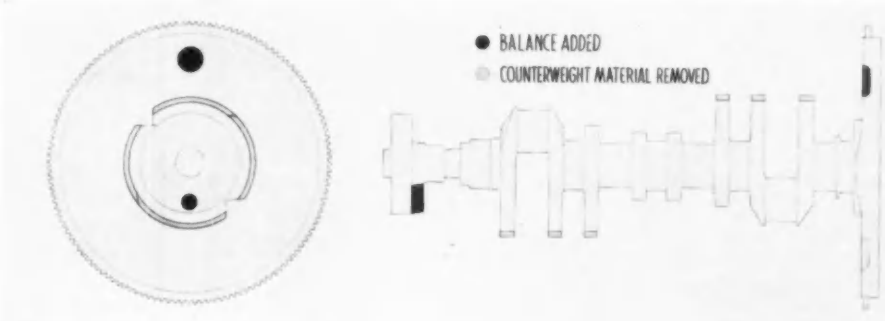
are employed for the heads as well as for exhaust manifold atachment.

The crankshaft is made of a steel forging with induction-hardened main and connecting rod bearing journals. Counterweighting has been reduced 30 per cent, and compensated for by adding balancing weight on both the flywheel and vibration damper. This allows cylinder block decks to be lowered one-half inch without affecting clearances between rotating and reciprocating parts.

The cooling system is of three-stage design to effect fast warm-up in cold weather. It features a large

(*Turn to page* 61, *please*)

Right front quarter view of the Super-Duty truck engine



Arrangement of weights on the externally - balanced crankshaft

Average 1958 Automobile Uses 52.40

COMPARISON OF MAXIMUM USE OF ALUMINUM BY AVAILABLE MODEL OF EACH MAKE VS. THE AVERAGE USE BY EACH MAKE (1958 Models)

Make	Model for Maximum Use	Maximum* Lb. Car	Average Lb. Car
Cadillac	Brougham	305.84	86.32
Imperial	4-Door Sedan	131.54	109.55
Buick	4-Door "Roadmaster" (with Flite Pitch Dynaflow)	116.55	73.92
Chrysler	4-Door "New Yorker" Sedan	115.72	90.60
De Soto	Fireflite 4-Door Sedan	111.99	86.15
Lincoln	Continental Convertible	109.16	90.97
Plymouth	Belvedere V-8 Convertible	108.40	70.57
Dodge	Custom V-8 Convertible	97.86	71.78
Mercury	Park Lane Convertible	93.36	64.93
Edsel	Citation Convertible	80.93	55.04
Rambler	Ambassador 4-Door Sedan	87.38	53.78
Oldsmobile	"98" 4-Door Hardtop	76.98	55.14
Ford	Fairlane 500 V-8 Convertible	76.89	48.01
Chevrolet	Impala	71.87	29.22
Pontiac	Star Chief 4-Door Hardtop	69.38	42.46
Studebaker	Hawk	61.25	24.90
Packard	Hawk	59.78	37.01

* Includes 100% use of automatic transmission, power steering, power brakes, air suspension (where used) and air conditioning (except in convertibles).

THE average American 1958 model passenger car utilizes more than 52 lb of aluminum for a record 29 per cent increase over the 40.5 lb used in 1957 models. Based on forecasts for a 1958 model output of 5.5 million cars, total automobile industry usage of aluminum would soar to over 288 million lb this year.

This climb in the poundage of aluminum for automotive applications was disclosed in the third annual survey report by Aluminum Co. of America at the SAE Annual Meeting in Detroit. The figure exceeds by a considerable margin previous aluminum industry estimates.

Alcoa last year stated that the average 1957 car would utilize 38.1 lb of aluminum (see AI, Jan. 15, 1957). This estimate was shortly revised to the 40.5 lb figure mentioned above.

Impressive gains have been scored by aluminum in both decorative and functional applications on the 1958 models. Almost two-thirds of this year's cars feature aluminum grilles, and color-anodized alumi-

APPLICATION OF ALUMINUM (BY CAR) ON AN ESTIMATED 1958 MODEL OUTPUT OF 5,500,000 UNITS

(Actual 1957 Model Output Percentages Plus Additions for EDSEL and RAMBLER AMERICAN)

			Average Car*		Automatic Transmission		Automatic Transmission, Power Brakes, Power Steering		
Car	Estimated Production (Cars)	Production (Per Cent of Total)	Estimated Production (Cars)	Aluminum Usage (Pounds)	Estimated Production (Cars)	Aluminum Usage (Pounds)	Estimated Production (Cars)	Aluminum Usage (Pounds)	Composite Total (Pounds per Car)
Total General Motors	2,422,750	44.05	421,801	20.16	994,349	39.69	1,006,600	57.51	43.70
Chevrolet 6	400,400	7.28	216,216	17.77	112,112	19.27	72,072	22.17	18.98
Chevrolet 8	933,900	16.98	186,780	21.81	579,018	35.91	168,102	38.81	33.61
Pontiac	284,900	5.18	8,547	22.37	133,903	41.37	142,450	44.70	42.46
Buick	348,150	6.33	6,963	41.57	110,015	72.32	231,172	75.65	73.92
Oldsmobile	329,450	5.99	3,295	32.39	59,301	50.95	266,854	56.35	55.14
Cadillac	125,950	2.29	.....	.....	.....	.....	125,950	86.32	86.32
Total Ford	1,866,700	33.94	386,622	33.06	985,600	54.78	494,478	62.21	51.62
Ford 6	144,100	2.62	36,025	29.84	86,460	49.35	21,615	49.73	44.28
Ford 8	1,294,700	23.54	323,675	32.99	776,820	53.50	194,205	53.87	48.43
Edsel	146,300	2.66	14,630	37.80	73,150	56.79	58,520	57.16	55.04
Mercury	245,850	4.47	12,292	41.61	49,170	65.57	184,388	66.32	64.93
Lincoln	35,750	0.65	.....	.....	.....	.....	35,750	90.97	90.97
Total Chrysler	1,042,800	18.96	121,368	40.36	468,748	75.84	452,684	84.52	75.48
Plymouth 6	111,650	2.03	22,330	35.86	66,097	72.10	23,223	76.28	65.72
Plymouth 8	447,700	8.14	89,540	41.92	265,038	78.16	93,122	82.34	71.78
Dodge	248,600	4.52	7,458	33.44	113,113	70.75	128,029	74.93	71.78
De Soto	105,050	1.91	1,050	44.66	16,283	83.04	87,717	87.22	86.15
Chrysler	99,000	1.80	990	48.81	8,217	87.19	89,793	91.37	90.60
Imperial	30,800	0.56	.....	.....	.....	.....	30,800	109.55	109.55
Total S.-P. Corp.	62,700	1.14	26,482	13.30	24,502	34.42	11,716	35.22	25.69
Studebaker	58,850	1.07	26,482	13.30	23,540	34.34	8,828	34.49	24.90
Packard	3,850	0.07	.....	.....	962	36.11	2,888	37.31	37.01
Total Amer. Motors	105,050	1.91	34,100	39.81	55,310	59.85	15,640	62.99	53.78
Rambler 6	78,650	1.43	31,460	39.06	37,516	58.22	9,674	61.22	50.92
Rambler V-8	26,400	0.48	2,640	48.91	17,794	63.23	5,966	66.23	62.41
GRAND TOTAL:	5,500,000	100.00	990,373	28.17	2,528,509	52.67	1,981,118	64.77	52.40

* Note: Average car refers to composite car body model with aluminum weight distributed, but without automatic transmission, power brakes, or power steering.

COMPARISON—1958 vs. 1957 (Revised)

Average Car Usage of Aluminum (Pounds Per Car)

Car	1957 (Revised)	1958	Change (%)
Total General Motors	32.56	43.70	+34.2
Chevrolet	23.18	29.22	+26.1
Pontiac	36.22	42.46	+17.2
Buick	43.74	73.92	+69.0
Oldsmobile	43.74	55.14	+26.1
Cadillac	63.38	86.32	+36.2
Total Ford Motor Co.	35.96	51.62	+43.5
Ford	34.12	48.01	+40.7
Edsel	.....	55.04	.....
Mercury	43.20	64.93	+50.3
Lincoln	59.94	90.97	+51.8
Total Chrysler Corp.	67.32	75.48	+12.1
Plymouth	54.10	70.57	+30.4
Dodge	64.80	71.78	+10.9
De Soto	93.76	86.15	− 8.1
Chrysler	103.75	90.60	−12.7
Imperial	120.46	109.55	− 9.1
Total S.-P. Corp.	16.73	25.69	+53.6
Studebaker	15.60	24.90	+59.6
Packard	32.88	37.01	+12.6
Total American Motors	48.25	53.78	+11.5
Total (All Cars):	40.51	52.40	+29.4

lb of Aluminum

num is making its debut as a material for interior decoration as well as utility purposes.

Another "first" is found in Buick's use of an aluminum extrusion for a side panel; incidentally, Buick uses as many as 74 aluminum parts on some of its current models. Other new decorative applications for aluminum include wheel cover, bumper, and tail lamp body trim. The use of aluminum for trim on 1958 models has scored a 60 per cent increase by volume over last year and now accounts for 17 per cent of the total amount of aluminum.

Transmission housings and parts, pistons, brake drums, wheels, carburetors, battery cables, and spark plug parts are but a few of the expanding functional applications of aluminum. Chrysler, for example, uses a torque converter housing of aluminum that weighs only 10½ lb.

The new Edsel uses the light metal in front wheel brakes, transmission and control units, engine assembly, and a host of other items. Chevrolet is using aluminum reinforcements to add rigidity to the plastic body of the 1958 Corvette. Developmental work is proceeding rapidly on such potential aluminum applications as engine blocks and heads, roofs, bumpers, and radiators. It is conservatively estimated that the average use of aluminum may increase to 75 lb per car by 1965.

Ford's Heavy Duty Trucks

(Continued from page 59)

water pump of special design capable of pumping over 200 gpm. A plate type oil cooler is mounted in the cylinder block without external plumbing lines.

The induction system consists of a low silhouette four-barrel carburetor with a thermostatically-controlled carburetor intake. It is also fitted with a de-popper valve.

One of the major features of these engines is the employment of a Tokheim electric fuel pump of pusher type, submerged in the fuel tank. It has a primer switch for starting and an oil pressure-actuated safety switch to shut off if the engine is stalled or oil level low.

In addition to a heavy-duty cellulose-fibre dry type air cleaner and special high duty oil filter, the engines are equipped with a sensitive mechanical governor and a mechanical tachometer. The governor has a direct mechanical linkage to the carburetor; while the carburetor incorporates a clutch connecting the throttle shaft to the accelerator pedal linkage. The clutch is engaged when engine speed is below governed speed. Once the full-load engine speed is attained the main actuating lever on the governor takes control and will disengage the clutch. When engine speed falls below the governor full-load setting the clutch automatically re-engages.

Another major feature of these engines is the provision of a compact 50-amp alternator, used in conjunction with a selenium rectifier. This takes the place of the usual generator.

Returning to some of the highlights of chassis features, it is noteworthy that the heavy-duty Bendix linkage type power steering gear is standard equipment on the two tandem models; optional on all others. Front axles for all models are Timken in a suitable range of sizes. Eaton two-speed, full-floating rear axles with Hotchkiss drive attachment and with electric shift are supplied for all models, except the two tandems. Timken U-200 and U-300 double-reduction rear axles are available for the C and F 1100 models.

A group of Eaton tandem axles of full-floating single reduction type, featuring a single power divider mounted on the forward axle, are offered for the tandem models. In addition, an Eaton 38M tandem axle is offered on the T-950. This axle is available with a choice of single-reduction and planetary double-reduction ratios, and is equipped with full air brakes.

A wide variety of transmission options is available, including five models of Spicer 5-speed units. These are available in direct-in-fifth for two Spicer models; and a choice of direct-in-fifth or overdrive-in-fifth for three Spicer models. Wide-ratio versions of the Spicer transmissions are used primarily with single-speed rear axles, in combination with two-speed axles in operations requiring maximum reduction, and with auxiliary transmissions. The close-ratio versions are used only with two-speed rear axles.

Spicer three-speed auxiliary transmissions are available in two models——Spicer 7231B and Spicer 7231D. The 7231B has close-ratio underdrive and close-ratio overdrive; 7231D has wide-ratio underdrive and close-ratio overdrive.

In addition, Ford offers across the board a choice of the Fuller R-46 Roadranger, eight-speed transmission having eight evenly-spaced progressive rear ratio steps.

Brakes for the various models naturally depend upon the customer's option as well as the type of axle equipment that is selected. On the F-850 and 950 and C-850 and C-950 there is a choice of vacuum-hydraulic as standard and full-air optional. Full air is standard on F-1000 and 1100, and on the C-1000 and 1100. On the T-950 full air is standard. The T-850 offers a choice of vacuum-hydraulic or full air, depending upon the choice of axle ratings.

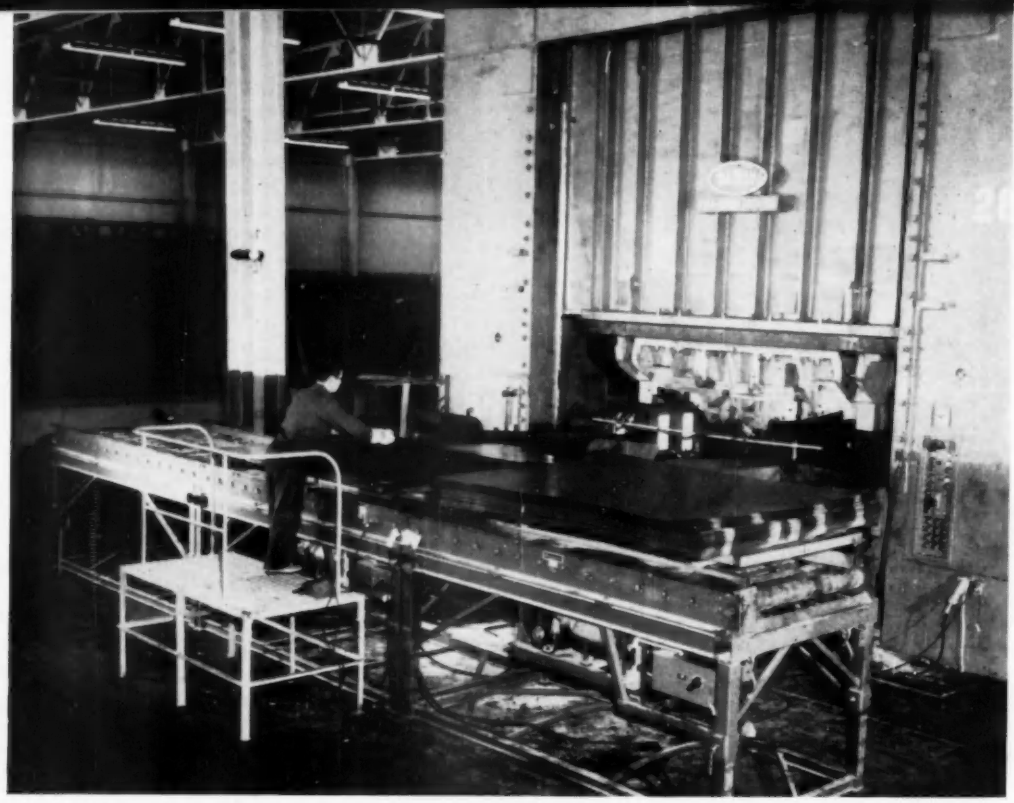


Fig. 1—The roof panel is the only part produced at Twinsburg using sheet steel. This view shows the method of manually loading sheets into the Danly press on blanking operation on line No. 28.

Chrysler's New Stamping Plant Will Have 28 Major Press Lines

By Joseph Geschelin

AT the time this article was written the Chrysler Corp. Twinsburg (Ohio) stamping plant, latest and one of the most advanced press shops in the industry, was nearing completion. As manufacturing executives know, it takes a long time to build an entirely new plant, equip it, and get it rolling. When the plant is in full operation it will have 28 major press lines and some 105 small individual presses set up in a plant featuring 1,500,000 sq ft of productive floor space.

Altogether the plant will have a total of some 260 large presses, five rated at 1800 tons, and most of the presses having ram speeds ranging from 10 to 30 strokes per minute. Some impression of the present state of completion may be gained from the fact that they have in operation at this writing two roof lines, four quarter panel lines, and one door assembly line. It will probably be some time late in the spring of 1958 before the plant is in full operation.

Equipped with the most advanced types of automation devices and automatic handling the plant is expected to produce more than 300 different kinds of stampings, including roof panels, rear quarter panels, door panels, deck lids, floor pans, hoods and fenders.

In general concept, the production area starts at the steel receiving bay where coil and sheet steel are unloaded by four, 25-ton Northern cranes, equipped with power-operated coil and sheet grabs. This bay will store approximately 25 days supply of steel. From these stores, the cranes transport steel to the decoilers or flex-rolls, as the case may be, where the stock is uncoiled, cleaned, flexed and cut off into shorter lengths or developed blanks. The flow of material will be in straight lines along each of the 28 press lines. After the panels have been formed they are transported to the assembly area by means of fork trucks.

The assembly area is being set up for producing assemblies such as doors, cowl tops, deck lids, windshield headers, and other miscellaneous parts for body assemblies.

The entire press area is serviced by a 20-ft deep basement gallery for access to the under side of the large presses. In addition, there are four transformer

Fig. 2—View of the back side of the Danly forming press on the roof panel line. Here we see the Sahlin iron hand just releasing the roof panel after pulling it out of the die and placing it on the shuttle leading to the trim press.

Fig. 3—After leaving the Danly trim press roof panels move onto the final conveyor line. All panels are inspected and lifted off the conveyor onto one of the metal stackers.

rooms and four fan rooms located in the basement.

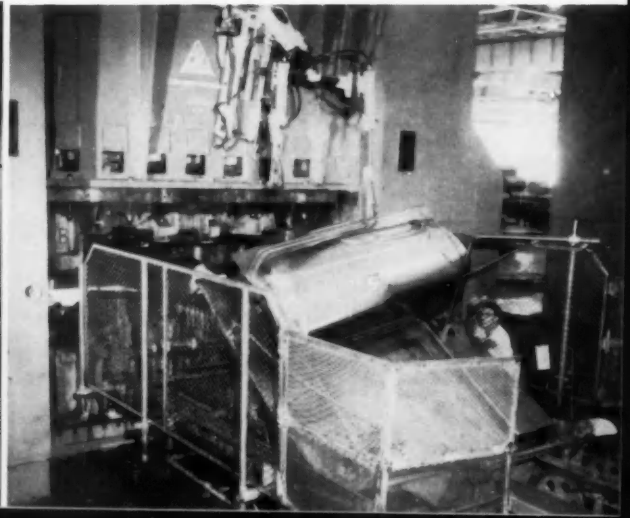
Scrap from the presses is arranged to feed onto a main scrap conveyor for transport to the baler house. This is a separate outside structure, housing two Logerman balers, each one capable of producing an 800-lb bale every 30 seconds. As scrap comes in on the scrap conveyor, it is automatically weighed and automatically dumped into one or the other baler hoppers. There is also provision for dumping loose scrap in case of a breakdown of a baler. The balers are of bottom discharge type, dropping the bales directly into a chute which loads the gondolas.

In operation, scrap from the presses drops into chutes located in front and back of each press. Then it drops into apron type conveyors which feed the main scrap conveyor located laterally in a pit between the first and second press of each line.

Profiting by experience gained in the industry in recent years, the building incorporates some advanced feature of fire-prevention. The roof consists of a metal

Fig. 4—The suction cup extractor used for removing quarter panel stampings from the die is seen here. The stamping slides along the bar which holds it in line and prevents tilting.

Fig. 5—Rear view of a Clearing press on the quarter panel line (No. 23) showing the two Sahlin iron hands used for handling this irregularly shaped part. The left arm has released the work, permitting the stamping to turn so as to fall in lengthwise position. After the right arm releases, the stamping drops and is caused to turn completely by the action of a metal bar on the platform.



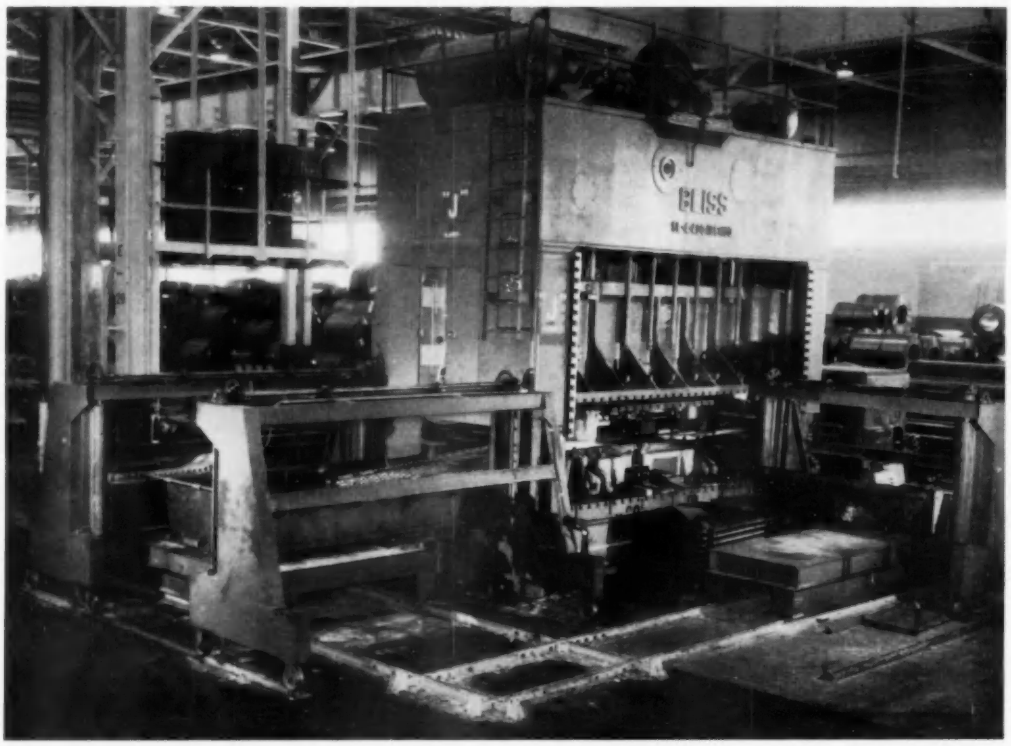


Fig. 6—Typical of the method of handling coil stock is the equipment group serving this 400-ton Bliss press. Stock is fed to the press from a McKay cradle, washer, flexing roll, straightening roll, and feed roll.

deck on the building purlins. The metal deck then is covered with a Koroseal vapor seal by means of adhesive and insulated with "Fescoboard" on top of which is installed a four-ply composition tar and gravel roof. The entire manufacturing building and basement have wet-type sprinkler systems installed for 100 per cent coverage.

Inasmuch as the plant is just getting under way, this article will touch on just a few details illustrated here. A more complete picture of the press shop area and assembly operations will be given in AI when production is in full swing, perhaps four or five months from now.

One of the views (Fig. 1) shows the manual loading of sheet steel into the stamping press line, No. 28 for the roof panel line. This is the only part that is produced from sheet steel. All other operations recieve stock in coil form. Line 28 is comprised of three Danly presses—for draw, form, and trim operations. The panels are handled automatically between presses by shuttles for loading and unloading. The modern material handling roller conveyor for feeding the first press, Fig. 1, is operated by foot pedals directly from the operator's platform.

Referring to press line 28, Fig. 2 shows the back side of press number two, the Danly forming press. Here the Sahlin iron hand has just released the roof panel after pulling it out of the die and placing it on the shuttle conveyor for movement to the Danly trim press, the third-in this line.

Another view of the roof panel line, Fig. 3, shows the final conveyor which is fed from the trim press. An inspector checks all panels, then two men lift the part from the conveyor and place it into one of the metal stackers.

Fig. 4 is a view of the quarter panel line showing the detail of the suction cup extractor on a portable conveyor section for removing the part from the die. The panel slides along the bar as it moves to the next press, the function of the bar being to keep the stamping in line and to prevent it from tilting.

The back side of a Clearing press, Fig. 5, on the quarter panel line (Line 23) shows the use of two Sahlin iron hands required to handle this irregular-shaped stamping. As seen here, the left arm has already released its grip on the left side, and the right arm is about to complete its release. As the left arm releases, the stamping begins to turn in mid-air so as to drop on the platform in length-wise position. A metal bar on the platform is so arranged as to cause the stamping to turn completely before it approaches the conveyor which may be seen at the extreme right.

Typical of the handling of coil stock is the view in Fig. 6. Here may be seen the decoiling equipment serving the 400-ton Bliss blanking press. The press receives stock from a McKay cradle, washer, flexing roll, straightening roll and feed roll. The press then discharges blanks down a roller conveyor to one of two transfer cars. Car transfer takes only 25 seconds, thus assuring continous unloading of the blanks.

Simple Machine Produces CORE for Honeycomb Structure

ROHR AIRCRAFT CORP., Chula Vista, Calif., has developed and put into operation a machine which forms and welds a ribbon of stainless steel to produce cellular core for honeycomb structure.

Resembling a weaver's loom, the machine consists of a series of wooden forming pins and copper electrode welding pins, mounted on horizontal bars which move up and down and sideways. This transverse movement permits forming and welding in alternate positioning of the comb-like pins. Advantages claimed for the arrangement are: Core cells are uniform in shape and size, because they are held unerringly in position by the pins; and the welding, too, is uniformly strong and accurate. Welding is accomplished by hand-rolling a small, copper electrode wheel down each channel of the corrugated stainless steel tape held firmly in place by the pins. The set of copper pins backs each cell and completes the circuit for electrical welding.

One impression over the wooden pins forms an even corrugation in the thin steel tape, then the next manipulation of the horizontal bars inserts the electrodes into position for welding of the ribbon. The cellular honeycomb core structure is built up a strip at a time, one strip forming half a row of cells, and the next lap completing the row. The width of the strip determines the thickness of the core structure.

Easy interchange of pin patterns makes it possible to turn out core material having various cell shapes —square, circular and sine wave, to name the most common. The new method provides control in the semi-automatic forming, locking and welding of these cellular patterns.

Rohr is operating eight of the new machines to produce honeycomb core used in the company's experimental program in the development of high-temperature honeycomb sandwich panels.

New machine which forms and welds a ribbon of stainless steel to produce cellular core for honeycomb structure

This four-door hardtop model in the Edsel Citation series uses more than 86 lb of zinc die castings for numerous trim items as well as functional parts. Arrows indicate a few external parts die cast from zinc.

Four Door Edsel Models Use 93 lb of Zinc

THE new Edsel exemplifies a trend toward expanded use of zinc die castings for a wide variety of functional and decorative parts. Four-door models of the Ranger and Pacer series use over 93 lb of zinc die castings, and four-door models of the Corsair and Citation series carry more than 86 lb of die cast zinc parts. Four-door station wagons top the line with over 99 lb.

Zinc is used in many important functional parts of the Edsel, including the fuel pump, instrument panel cluster, door handle assemblies, seat adjusting mechanism, horn ring assembly, heater and air con-

The Edsel uses zinc die castings for many intricate shapes and parts, such as the radiator grille, inner and outer headlamp doors, hood ornament assembly, and front hood molding (shown in illustration). In addition, many functional parts including the fuel pump, instrument panel cluster, door handle assembly, and seat adjusting mechanism make use of zinc.

ditioner parts, various brackets and handle assemblies, and windshield wiper parts. Additional and sizable quantities of zinc are also found in such components as power steering, power brakes, and automatic transmission assemblies. Functional parts are frequently cast from zinc alloy SAE 925, which is comparable to SAE 903 but with copper added.

All Edsel models use zinc for many ornamental parts, such as the radiator grille, lamp assemblies, rear seat radio speaker grille assemblies, trim escutcheons, nameplates, bezels, molding parts, and window regulator handles. Decorative parts are generally die cast of SAE zinc alloy 903 and are chromium plated, painted, or plated and painted.

The number of zinc applications in the Edsel is indicative of the foothold which the material has won in the automotive design engineering field. One major car maker reports that since 1952 his use of zinc die castings has jumped from 32 to 59 lb per car. Another manufacturer states that more than 140 lb of zinc were used in its 1957 model, and its 1958 model carries an even greater poundage.

Independent die casters report that 1958 car models contain heavier die cast zinc instrument cluster housings and larger die cast zinc tail light sections and headlight assemblies. Die cast zinc instrument board panels, roof trim, and interior and exterior upper quarter panels are also gaining in favor. One increase in particular is represented by the growing use of zinc die castings for window supports on hardtop models.

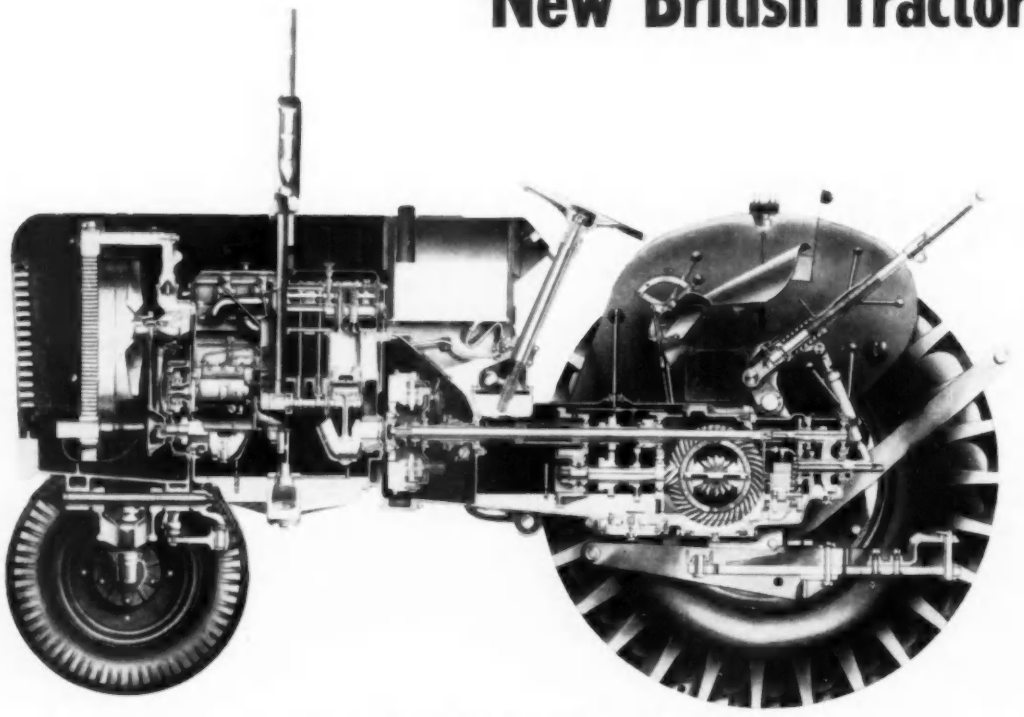
TYPICAL EDSEL ZINC DIE CASTINGS

*Series	Lb	Qty/Car	Part Name
R & P	0.14	1	Handle Assy., Parking Brake
R & P	1.15	1	Horn Ring Assy.
R & P	0.48	1	Bracket Assy., Steering Column
C & C		1	Bracket, Steering Column
R & P	0.0527	1	Adapter, Luggage Compt. Dr. Lock Switch Mtg.
All	6.75	2	Grille, Radiator
All	0.033	1	Bezel Ignition Switch
R & P	1.24	2	Door, Headlamp Inner
R & P	1.25	2	Door, Headlamp Outer
R & P	2.5375	2	Lamp Assy., Rear Outer
C & C	2.6147	2	Lamp Assy., Rear Outer
C & C	3.825	2	Lamp Assy., Rear Inner
R & P	5.310	2	Lamp Assy., Rear (Station Wagon)
R & P	5.005	2	Lamp Assy., Rear (Station Wagon)
R & P	3.4943	2	Lamp Assy., Rear Inner
C & C	0.215	2	Door Assy., Courtesy Lamp Nut, Seat Reg. Control Switch Bezel
R & P	0.0736	1	Nut, Luggage Compt. Door Lock
R & P	0.14	1	Handle, Top Control
C & C	0.01	1	Bezel, Top Control Handle
C & C	0.01	1	Spacer, Top Control Switch
R & P	0.050	1	Knob Assy., Speed Warning Control
R & P	0.044	1	Dial, Speed Warning Control
R & P	0.020	1	Bezel, Speed Warning Control
R & P	0.062	1	Cover Assy., Speed Warning Control Opening
C & C	0.1147	2	Plate Front Fender Name Corsair
C & C	0.1147	2	Plate Front Fender Name Citation
R & P	0.156	2	Plate Front Fender Name Villager
R & P	63 grams	2	Plate Front Fender Name Ranger
R & P	65 grams	2	Plate Front Fender Name Pacer
All		1	Ornament Assy., Front Fender Side
All	0.032	1	Plate Hood Top Ornament Retaining
All	0.1744	1	Ornament Assy., Hood Top
All	0.69	1	Moulding, Hood Front
R & P	0.130	2	Disk, Radio Tone Control
R & P	0.40	1	Bezel Radio Control
R & P	0.3125	1	Grille Assy., Radio Rear Seat Speaker
C & C	0.408	1	Grille Assy. Radio Rear Seat Speaker
All	0.040	1	Bezel Assy., Parking Brake Release
All	0.59	2	Moulding, Radiator Grille Opening Pane
All	0.09	1	Moulding, Instr. Panel Pad Ret. Inner
All	6.45	2	Extension Assy., Rear Door
All	1.098	2	Handle Assy., Rear O/S Door
All	0.18	2	Moulding, Quarter O/S Finish
C & C		1	Cover Assy., Back-up Lamp Opening
C & C	1.667	1	Moulding, Upper Back Panel
C & C	2.275	1	Handle Assy., Luggage Compt. Door
C & C	0.60	2	Ornament, Roof Side
C & C	0.06	2	Moulding, Instrument Panel Upper Covering
Ranger	0.048	1	Plate Instr. Panel Name Ranger
All	0.011	1	Moulding, Instr. Panel Pad Ret. Inner
All	0.08	1	Moulding, Instr. Panel Pad Ret. Inner
All		4	Handle Assy., Window Regulator
All 4-doors	0.670	2	Handle Assy., Rear Door O/S
R, P, Corsair	0.024	10	Letters, Body Side Edsel
All	1.536	1	Moulding Assy., Luggage Compt. Door
All		1	Handle Assy., Luggage Compt. Door
Stat. Wagons	1.12	1	Ornament, Lift Gate
Stat. Wagons		1	Handle Assy., Front Seat Track Adj.
Stat. Wagons	1.99	1	Handle Assy., Tail Gate
Stat. Wagons	0.103	1	Clip Assy., Visor Arm
Stat. Wagons	2.449	1	Moulding, Luggage
Stat. Wagons	0.05	1	Plate Instr. Panel Name Villager

* (R—Ranger; P—Pacer; C—Citation; C—Corsair).

Pinpointed in view, below, of a convertible in the Edsel Pacer series, are additional applications of zinc die castings. Four-door models in the Pacer line use over 93 lb of the material

Design Features of New British Tractors



Cutaway view of the David Brown 900 Livedrive

SEVERAL British tractor manufacturers have recently introduced new models incorporating advanced design features. Massey-Harris-Ferguson has extended its production range with the Massey-Ferguson 65 powered by a 50-hp Diesel engine. The basic transmission with six forward and two reverse ratios is similar to the smaller "35", but input speed is twice as great to enable the small gears to handle the higher power.

Epicyclic reduction gears on each drive wheel return the speed to normal. Double-disk brakes are used on each half-axle where the high shaft revolutions give increased performance at low ground speeds. Located on the inboard end of the axles, the brake units are fully enclosed and protected from dirt, dust and water. The differential includes a pedal-operated lock using a splined coupling to connect the inner ends of the two shafts.

There is a dual clutch that disengages the main drive and then the hydraulic pump and pto with progressive pedal movement. The optional power steering assembly is located in an easily accessible position behind the radiator grill. Power-adjusted rear wheel track width is another optional extra. The tractor is produced by Standard Motor Co.

The engine is a new Perkins four-cylinder Diesel developing 50.5 hp at 2000 rpm. Designated P4/192 (TA), the 192.4-cu in. unit has a 3.5-in. bore, 5-in. stroke, and 16.5 to 1 compression. Refinements include a mechanical governor built into the fuel pump body, and a pto to drive a hydraulic pump from the lower idler timing gear.

David Brown Developments

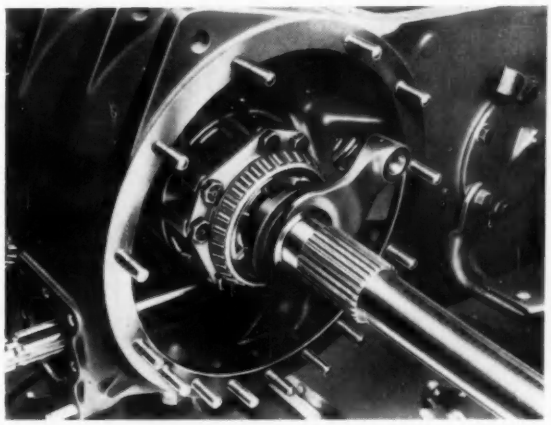
David Brown has produced a "Livedrive" version of its 900 model with a 40-hp Diesel. Main drive and pto shafts are concentric, and extend rearwards from the double action clutch. The latter has three distinct phases of disengagement. Transmission is disconnected with the first pedal movement, after which a second position provides a neutral zone to minimize clutch plate wear. Finally the pto and hydraulic pump are released.

Another David Brown development is a narrow track model 2D for row crop, orchard and vineyard

work. Overall width is reduced from 78 to 41 in. Basic design remains inchanged, with a 14-hp Diesel carried at the rear of the tubular frame whose 4-in. members serve as an air reservoir for the pneumatically-controlled mid-mounted implements.

Three-Cylinder Nuffield

Nuffield has brought out a new three-cylinder tractor whose engine shares many common parts with the existing Diesel engine made by the British Motor Corp. With a volume of 155.6 cu in. and 16.5 to 1 compression it develops 37 hp at 2000 rpm. The direct injection unit uses shrouded inlet valves to promote swirl on induction. A five-gear transmission provides a speed range from 0.5 to 14 mph.



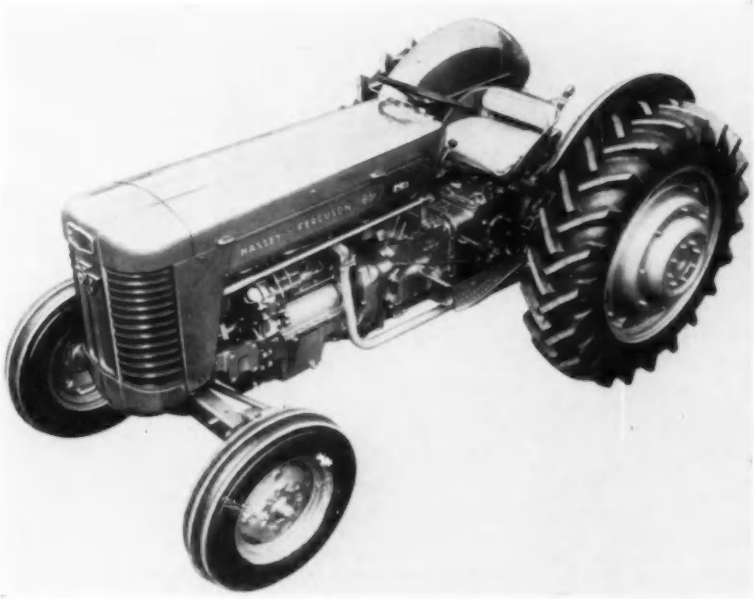
International Harvester of Great Britain has introduced the BTD-640 crawler, and agricultural version of its BTD-6 industrial tractor. It is powered by the IH 264-cu in. Diesel rated at 42 hp at 1450 rpm. Maximum drawbar hp is 31, and sustained drawbar pull in first gear is 9600 lb. Clipped corner track shoes and three-point track suspension are designed to give maximum ground contact over rough terrain without distortion. The 8500-lb machine has a ground pressure of 6 psi.

New Tractor Transmission

A new hydrostatic transmission for tractors, developed by Dowty Hydraulic Units Ltd., provides infinitely variable ratios in both directions with a single lever controlling forward, braking and reverse. The system comprises a 10-cylinder axial pump whose swash angle can be varied 35 deg on either side of zero delivery, and a motor (or motors) of similar construction but with a fixed swash angle.

A gear-type pump supplies base pressure to the hydraulic system. It resets the main pump to zero swash angle when the engine is started, and also operates a low-pressure booster circuit which prevents aeration and assists in circulating cool oil. The system permits a flexible transmission layout as its basic components can be variously located. A single motor may be coupled to the differential, or individual motors may drive the wheels without need of a differential.

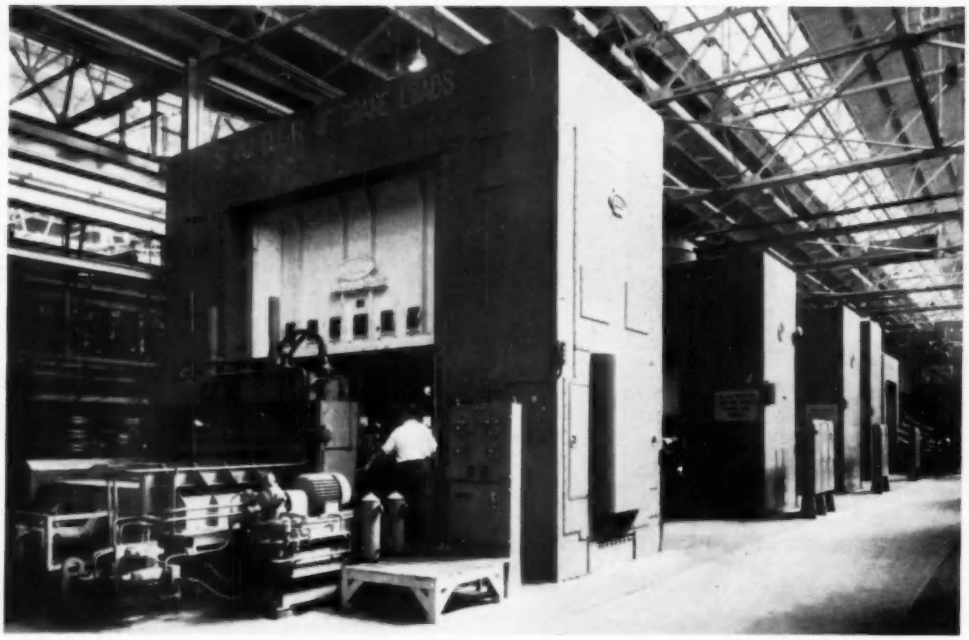
Dunlop has produced a disk brake unit specially designed for tractors. It is mechanically operated with the friction pads carried on pressed steel members.



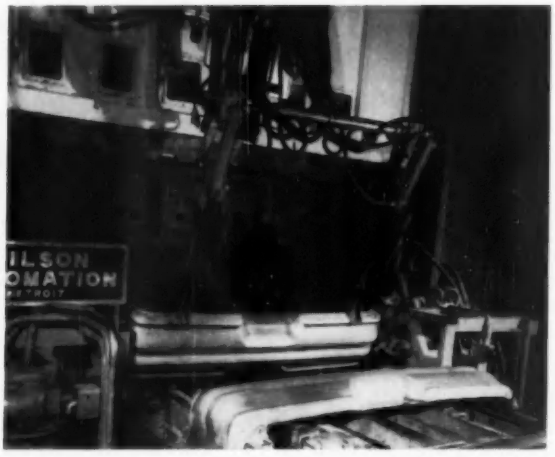
ABOVE — Pedal-operated differential lock on the Massey-Ferguson 65

RIGHT — Massey-Ferguson 65 which is powered by a 50-hp Diesel

Plating Ford Bumper Bars in 700-Ft Automatic Machines



One of the two bumper stamping lines at the Ford Monroe plant. The first machine in the line is the 1500-ton Danly, double-acting press for the forming operation. Here may be seen the Wilson Automation for feeding blanks into the press automatically.



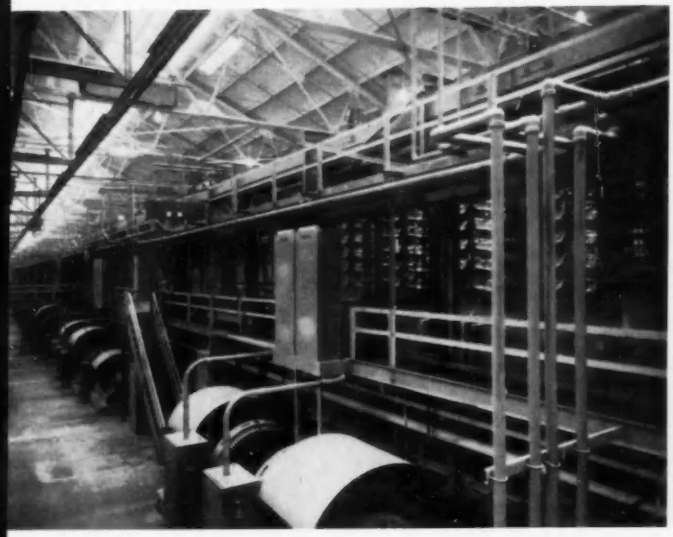
This view, taken at the rear of the first operation Danly press, shows the Wilson Automation with two iron hands for extracting the double stamping from the die. The blank is then deposited on the transfer conveyor in the foreground for transport to the next press.

FORD Motor Company's Monroe (Mich.) plant provides ample space and manufacturing facilities for the stamping and electroplating of front and rear bumpers for Ford cars.

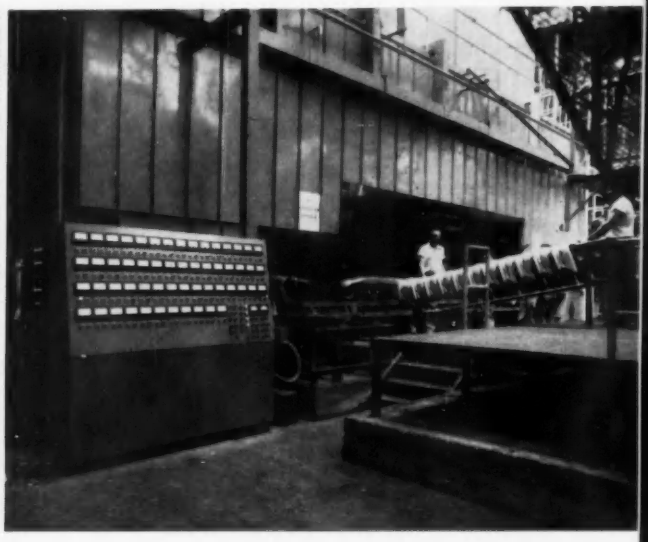
Among the most impressive pieces of equipment here are two Udylite rack-type plating machines, each one running 700 ft in length and said to be the largest of their kind installed in the automotive industries. These machines are characterized as being of straight line full automatic type. They are served by an installation of 80 motor-generator sets.

An interesting feature of the operation is in the use of "white brass," a composition of 65 per cent zinc and 35 per cent copper, to replace one of the usual nickel coatings. An experimental production line using this procedure was operated at Monroe for some 18 months to prove the process before placing it in regular production. Durability and corrosion-resistance testing of parts during this period are said to have shown outstanding results.

Let us consider first the stamping of bumper bars. They are handled two at a time, using double blanks



One of the two 700-ft long Udylite plating machines. Some of the plating racks, loaded with bumpers, may be seen through the protective screening. At the side may be seen part of the installation of 80 motor-generator sets serving the platers.



Loading station of one of the four automatic cycle polishing and buffing machines. Once loaded on the gravity conveyor table at the right, the bumper stampings are handled automatically. In this booth, they traverse an array of some 92 wheels.

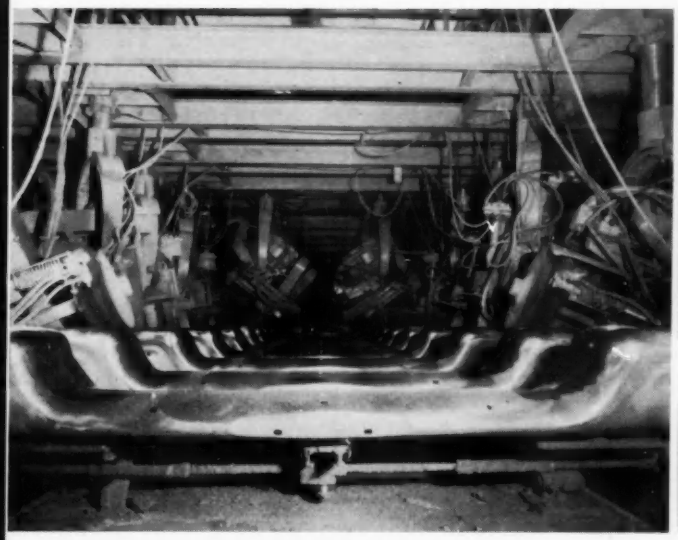
of 12-gage (0.106-in.) steel plate. Blanks for front bumpers are 24 by 106 in.; blanks for rear bumpers are 22 by 88 in.

Two press lines have been installed—one for the front, one for the rear bumper. The large Danly press, illustrated here, is of double-acting type and is used for the first forming operation. It has a rating of 1500-tons for the punch. There are six presses in each row, with 1500-ton Hamilton presses for restrike and trim operations. Each press is capable of producing at the rate of 600 pieces an hour.

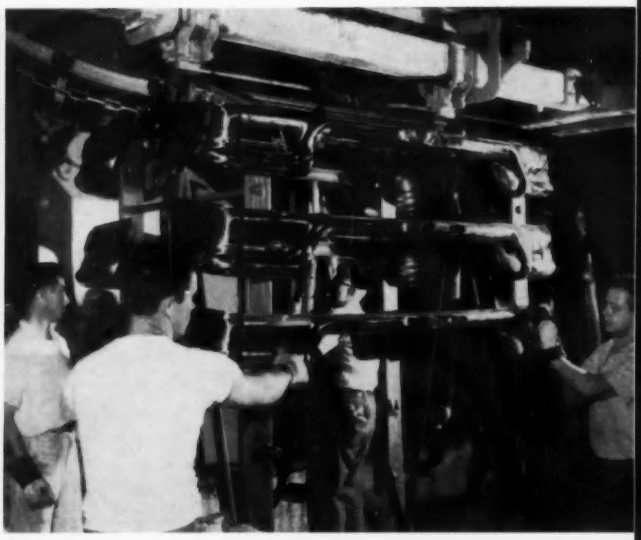
A distinctive feature of the press lines is in the employment of Wilson Automation to eliminate manual handling. One familiar phase of such automation is illustrated, showing the use of two mechanical hands for extracting the stamping.

The sequence of operations on each line is as follows: form; pierce and restrike; cup and restrike; separate into two pieces; and trim. The trim operation

(*Turn to page* 109, *please*)



Interior view of one of the polishing booths showing wheel heads on one section of the merry-go-round line.



After polishing, bumper bars are fastened to racks, ready for loading into one of the plating machines.

• • INDUSTRY STATISTICS • •

WEEKLY U. S. MOTOR VEHICLE PRODUCTION

As reported by the Automobile Manufacturers Association

Make	Weeks Ending Jan. 4, '58	Weeks Ending Dec. 28, '57	Calendar Year 1957	Calendar Year 1956
PASSENGER CAR PRODUCTION				
Hudson			1,345	7,182
Nash			3,561	17,841
Rambler	2,599	2,698	109,178	79,162
Total—American Motors	2,599	2,698	114,084	104,185
Chrysler	898	555	118,733	107,490
De Soto	41	67	117,747	104,395
Dodge	674	606	292,386	205,820
Imperial	283	133	37,946	*
Plymouth	5,736	5,383	655,526	452,918
Total—Chrysler Corp.	7,632	6,744	1,222,338	870,623
Edsel	317	395	54,600	
Ford	19,464	22,988	1,522,406	1,373,542
Lincoln	686	548	37,870	48,995
Mercury	2,947		274,827	246,628
Total—Ford Motor Company	23,414	23,931	1,889,703	1,669,165
Buick	5,593	6,905	407,271	535,364
Cadillac	1,714	2,025	153,236	140,873
Chevrolet	24,331	24,608	1,522,550	1,621,018
Oldsmobile	5,999	6,532	390,091	432,903
Pontiac	5,368	6,052	343,298	332,268
Total—General Motors Corp.	43,005	46,122	2,816,446	3,062,426
Packard		153	5,495	13,432
Studebaker		422	67,370	82,955
Total—Studebaker-Packard Corp.		575	72,865	96,387
Checker Cab			3,871	3,970
Total—Passenger Cars	76,650	80,070	6,119,307	5,806,756

* Included with Chrysler.

Make	Weeks Ending Jan. 4, '58	Weeks Ending Dec. 28, '57	Calendar Year 1957	Calendar Year 1956
TRUCK AND BUS PRODUCTION				
Chevrolet	3,879	4,142	351,739	353,510
G. M. C.	956	1,037	69,675	91,485
Diamond T	63	76	5,845	5,061
Divco	48	60	2,871	3,570
Dodge and Fargo			76,601	91,516
Ford	4,311	3,961	337,126	297,308
F. W. D.	15	44	1,073	1,645
International	2,130	1,502	121,775	137,840
Mack	261	269	17,360	18,304
Reo	Incl. in White		1,602†	1,608
Studebaker		70	9,374	15,222
White	253	252	20,374	19,540
Willys	1,123	1,073	75,860	64,883
Other Trucks	50	60	4,150	6,304
Total—Trucks	13,089	12,546	1,095,425	1,107,796
Buses	70	70	3,970	4,206
Total—Motor Vehicles	89,809	92,686	7,218,702	6,918,758

†—Jan. through June 8, 1957.

1957 TRUCK TRAILER SHIPMENTS

Type of Trailer	October	Ten Months 1957	Ten Months 1956
Vans			
Insulated and refrigerated	290	3,922	4,583
Steel	33	532	980
Aluminum	257	3,390	3,603
Semi-insulated	74	538	N.A.
Steel	74	538	N.A.
Aluminum			N.A.
Furniture			
Steel	91	1,369	1,824
Aluminum	91	1,369	1,824
All other closed-top	2,060	17,691	22,269
Steel	843	8,011	9,635
Aluminum	1,217	9,680	12,634
Open-top	279	2,719	3,163
Steel	132	1,381	1,432
Aluminum	147	1,338	1,731
Total—Vans	2,794	26,239	31,839
Tanks			
Petroleum	337	3,725	4,576
All other	117	1,242	865
Total—Tanks	454	4,967	5,441
Pole, pipe and logging			
Single axle	34	341	527
Tandem axle	40	540	1,189
Total	74	881	1,716
Platforms			
Racks, livestock and stake	241	2,083	820
Grain bodies	92	1,140	1,442
Flats, all types	428	5,639	7,318
Total—Platform	761	8,862	9,580
Low-bed heavy haulers	182	2,490	2,646
Dump trailers	142	1,751	1,841
All other trailers	338	3,041	2,323
Total—Complete Trailers	4,745	48,231	55,386
Chassis	229	3,612	3,298
Total—Trailers and Chassis	4,974	51,843	58,684

N.A.: Not Available. Source: Industry Div., Bureau of the Census.

REGIONAL SALES OF NEW PASSENGER CARS

Zone	Region	October 1957	September 1957	October 1956	Ten Months 1957	Ten Months 1956	Per Cent Change Oct. over September	Per Cent Change Oct. over Oct. 1956	Per Cent Change Ten Months 1957 over 1956
1	New England	26,202	26,904	24,423	273,962	287,690	− 2.61	+ 7.28	− 4.77
2	Middle Atlantic	88,915	91,991	81,253	976,891	960,671	− 3.34	+ 9.42	+ 1.69
3	South Atlantic	60,723	64,888	57,201	647,775	659,053	− 6.42	+ 6.16	− 1.71
4	East North Central	106,783	119,955	98,848	1,241,458	1,223,926	−10.98	+ 8.03	+ 1.43
5	East South Central	19,984	22,510	20,894	240,720	247,470	−11.22	− 4.36	− 2.73
6	West North Central	39,899	44,438	33,813	442,628	434,416	−10.21	+18.00	+ 1.89
7	West South Central	44,825	45,620	41,164	474,328	464,446	− 1.74	+ 8.89	+ 2.13
8	Mountain	18,326	17,107	14,014	172,708	167,706	+ 7.13	+30.77	+ 2.98
9	Pacific	58,138	61,804	52,804	594,520	591,861	− 5.93	+10.10	+ .45
	Total—United States	463,795	495,217	424,414	5,064,990	5,037,239	− 6.35	+ 9.28	+ .55

States comprising the various regions are: Zone 1—Conn., Me., Mass., N. H., R. I., Vt. Zone 2—N. J., N. Y., Pa. Zone 3—Del., D. of C., Fla., Ga., Md., N. C., S. C., Va., W. Va. Zone 4—Ill., Ind., Mich., Ohio, Wis. Zone 5—Ala., Ky., Miss., Tenn. Zone 6—Iowa, Kan., Minn., Mo., Neb., N. D., S. D. Zone 7—Ark., La., Okla., Tex. Zone 8—Ariz., Colo., Ida., Mont., Nev., N. M., Utah, Wyo. Zone 9—Cal., Ore., Wash.

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BOOST 80 PSI AIR

Input Range: 40 to 3000 psi Air or Fluid

TO 2000 PSI HYDRAULIC PRESSURE

Output Range: 200 to 10,000 psi Fluid

- Save space, weight and investment cost by replacing pump installations in many applications
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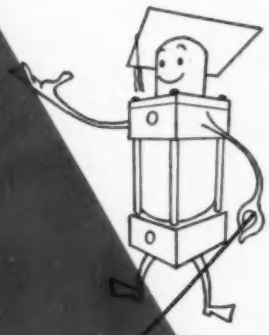
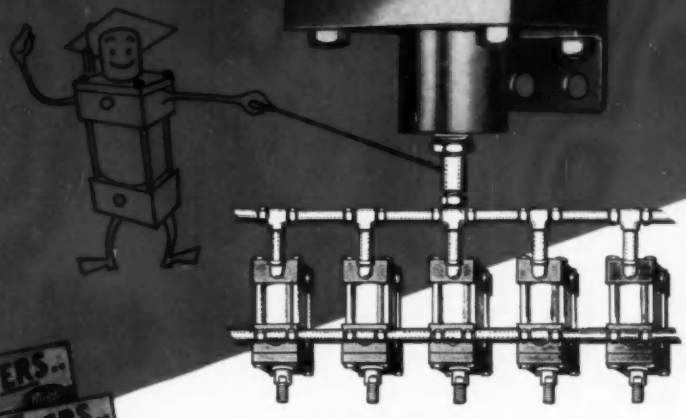
- Provide — at point of cylinder thrust — more efficient power with less weight in less space than direct driven air cylinders
- Save up to 95% of air consumed by direct driven air cylinders
- Operate at speeds of 30 to 450 strokes per minute

NOTE: In addition to its most complete line of "Custom-Built" Boosters available on normal delivery, Miller offers 5" bore, 25 to 1 ratio, boosters for immediate delivery in either 6" or 12" stroke. Write for data and prices.





FULL DETAILS IN MILLER BULLETIN B-200 SENT FREE ON REQUEST

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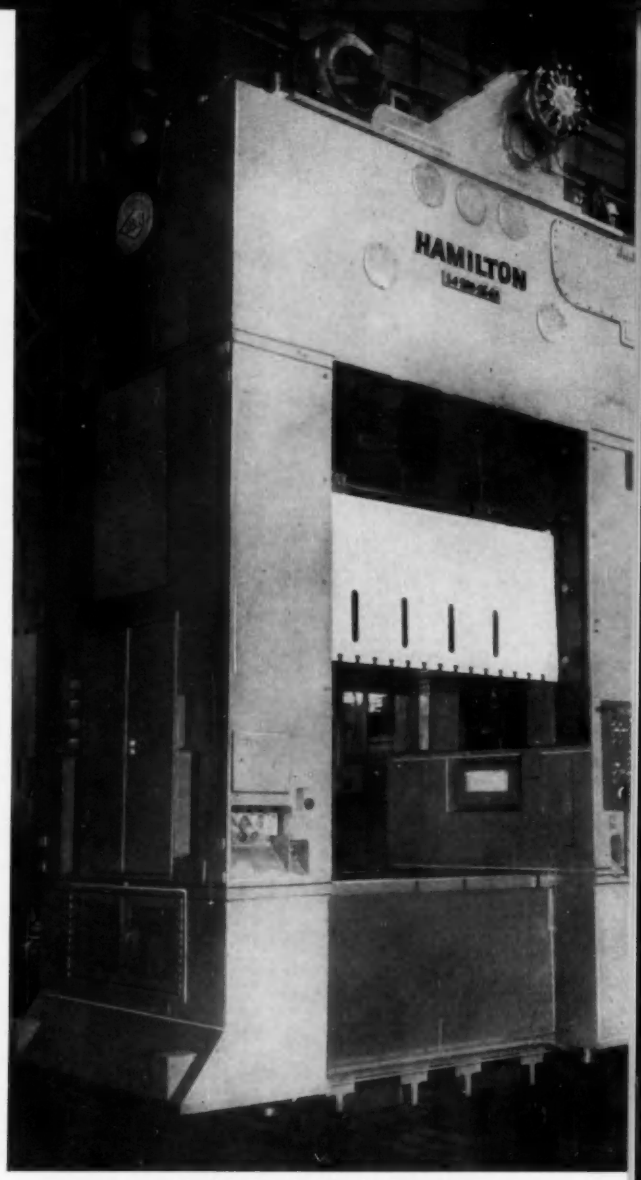
AIR & HYDRAULIC CYLINDERS • BOOSTERS • ACCUMULATORS
COUNTERBALANCE CYLINDERS

Hamilton 400-ton 2-point eccentric press



Hamilton 500-ton 4-point eccentric press

Hamilton mechanical presses spell the maximum in versatility

No matter what your press requirements are, you probably won't have to incur the extra expense of special designing and "tailor-made" manufacturing if you explore the versatility of the two basic Hamilton press designs pictured above.

The Hamilton 400-ton 2-point eccentric press represents our conventional design, meeting all the basic needs of stamping plants all over the world. And it is so designed that many optional features may be readily added to transform it into a press capable of doing more highly specialized work.

Extra features include automation equipment, air and electric controls and outlets, die lights, die safety blocks, provision for feeds, inbuilding and automatic circulating oil lubrication. These features are built into the 4-point press shown above. Let your Hamilton sales engineer discuss your needs with you.

Hamilton Division Hamilton, Ohio

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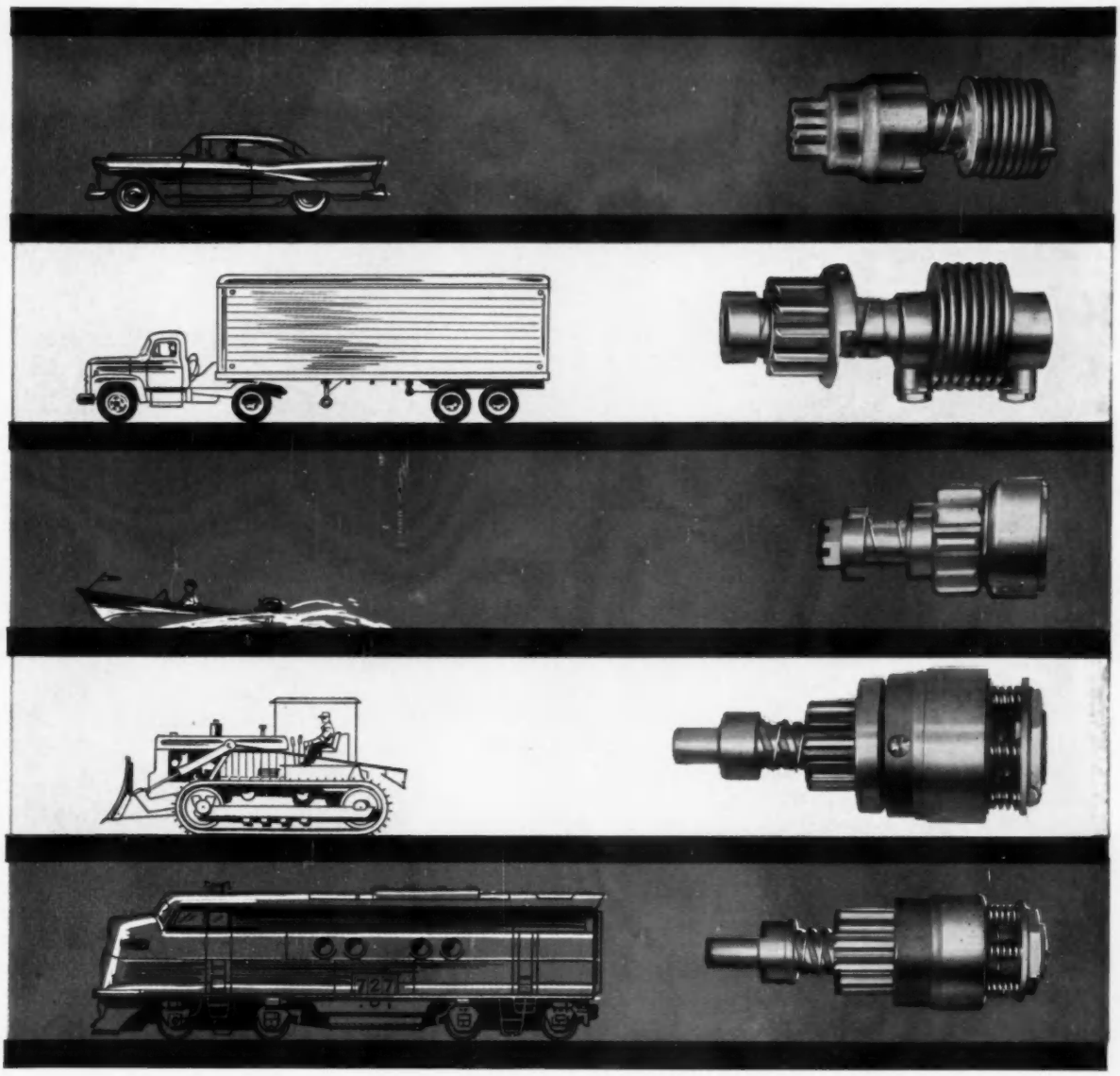
BALDWIN BLH LIMA-HAMILTON



BIG OR SMALL . . . BENDIX DRIVES START THEM ALL

Throughout the world of transportation it's an accepted fact that *you start with Bendix!* And it's not surprising. Bendix* Starter Drives have been synonymous with dependability for fifty years in the automotive field. They've proved themselves just as reliable on submarines, aircraft, earth movers, outboard motors, helicopters. In fact, every type of internal-combustion engine ever built has used a Bendix Starter Drive. Hospitals use Bendix Drives to activate their stand-by equipment. Air raid sirens across the country are started with Bendix Drives. It's logical to believe that such universal acceptance indicates a standard of quality which no other manufacturer has been able to match. Need we say more?

*REG. U. S. PAT. OFF.

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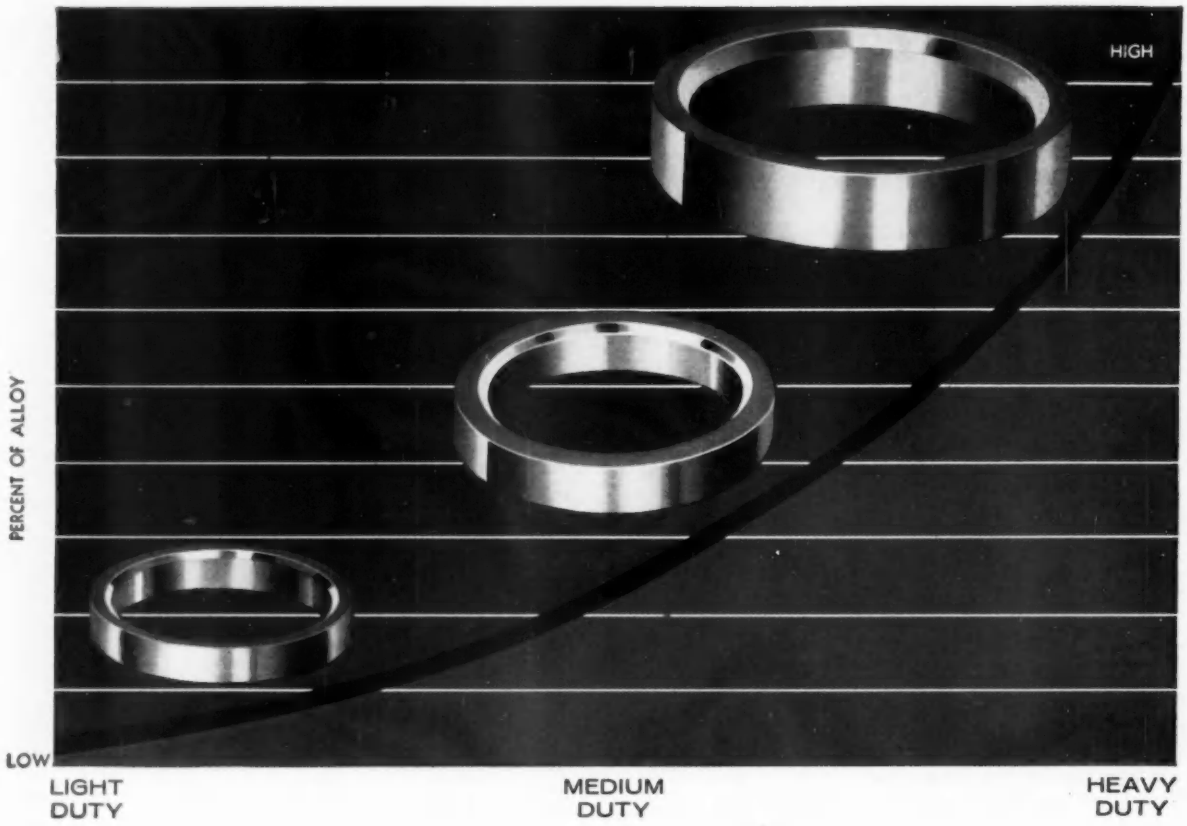


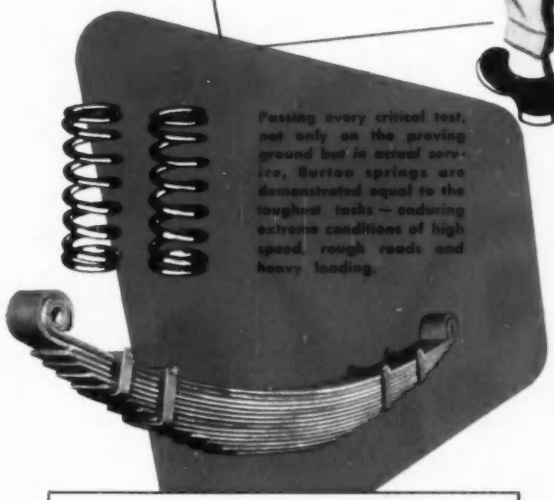
The RIGHT Insert for the Specific Application is Always the Most Economical

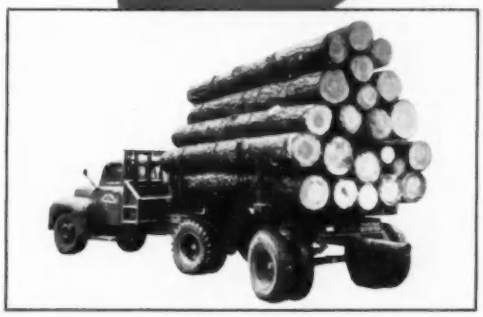
For heavy duty service involving extreme wear, corrosion, and oxidation, the highest performance high-alloy seat insert that can be produced is almost certain to be the most economical. On the other hand, for light duty service, a low cost insert of low alloy content may be adequate for the requirements. Eaton produces seat inserts "custom tailored" to meet the demands of each specific application — skillfully blends chromium, nickel, molybdenum, tungsten, cobalt, and iron to provide the right properties to overcome wear, corrosion, and oxidation. The result is inserts which will give optimum life at lowest cost, in the kind of service for which they are designed.

Call our engineers for a consultation on your seat insert problems.

EATON MANUFACTURING COMPANY — SAGINAW DIVISION
9771 FRENCH ROAD • DETROIT 13, MICHIGAN

FOR THOSE TOUGH ONES


Passing every critical test, not only on the proving ground but in actual service, Burton springs are demonstrated equal to the toughest tasks — enduring extreme conditions of high speed, rough roads and heavy loading.



Let Burton engineers, backed by modern equipment and scientifically controlled methods, solve *your* spring suspension problems.

Snagging a Spare with a four-ten split takes plenty of *know-how* . . . an important factor in Automotive Suspension as well as Bowling.

BURTON *know-how* in design and engineering of springs, that cushion the shocks and carry the weight of the load, contributes materially to the performance of the entire vehicle.

By combining time-tested advantages of steel springs with newest developments in their design and engineering, proper load balance, controlled sidesway and rebound, positive alignment, and structural strength are achieved.

Your suspension requirements are sure to be met most satisfactorily with the aid of BURTON *know-how* in this specialized field. Your inquiry will receive prompt, competent attention.

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U. S. Patent
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THE **Sealed Power**

STAINLESS STEEL OIL RING

News of the MACHINERY INDUSTRIES

Although New Orders for Machine Tools Have Been Declining, Shipments Have Remained High and Economic Necessity Should Force a Resumption of Volume Buying

By Charles A. Weinert

A Look At The 1957 Record

Capital Goods

Plant and equipment expenditures by all U. S. business during 1957 rose to an indicated all-time high, according to a recent survey conducted jointly by the U. S. Department of Commerce and the Securities and Exchange Commission. Outlays reached a seasonally-adjusted annual rate of $37.75 billion in the 3rd quarter, and are expected to approximate an annual rate of $37.5 billion in the 4th quarter. During the first half of 1957 the annual rate of expenditures was $37 billion. If the 4th quarter figure materializes as anticipated, capital outlays for the full year 1957 will exceed $37 billion, or six per cent more than the previous high of $35 billion reported for 1956.

The above report, however, indicates that motor vehicle makers substantially reduced their capital outlays in 1957. Estimated 1957 expenditures are $1.121 billion, while 1956 expenditures were $1.689 billion.

All Business

Overall, it would appear from the current unfinalized statistics that 1957 was a very good business year for U. S. industry from the standpoint of goods' production. On the other hand, it seems pretty conclusive that the latter portion of the year saw a decided drop-off in commitments for new work.

Machine Tools

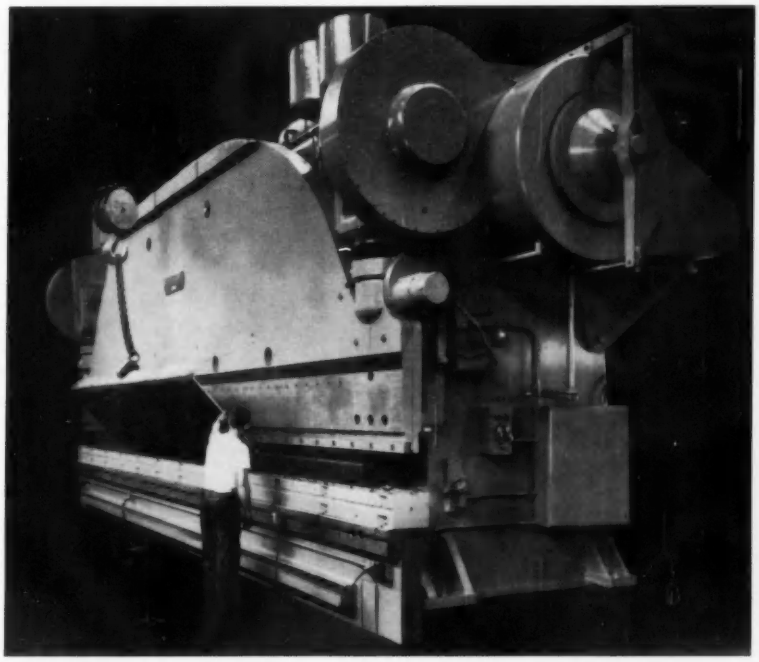
As noted in AI for January 1, metal-cutting-type machine tool *shipments* during 1957 approximated $825 million. The comparable 1956 figure was $886 million, while 1955 billings were $670.4 million. The value of 1957 *new business* amounted to about $525 million. Orders booked in the prior two years totaled $924 million and $927.1 million, for 1956 and 1955 respectively. These particular figures are as supplied by the National Machine Tool Builders' Association. The values for new business are *net* orders—gross new orders less cancellations.

Gears, Tools and Dies

The American Gear Manufacturers Association reports that 1957 gear business, dollar-wise, is expected to be the second best in modern history—about 12 per cent below 1956, the biggest year.

The National Tool & Die Manufacturers Association similarly re-

(*Turn to page* 98, *please*)

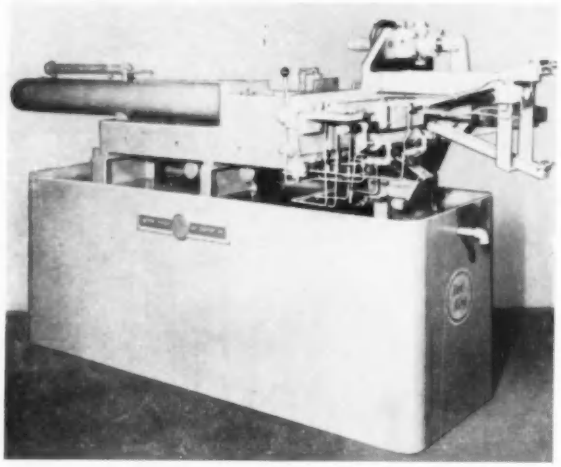


Used for forming and punching aluminum, the Cincinnati Shaper Co. machine illustrated is reputed to be one of the largest two-housing, mechanical-drive press brakes ever built. It is 30 ft 6 in. between housings, and has an overall die surface of 34 ft. Stroke is eight inches and shut height is 23 in.—both special for this Series 50 machine. Throat clearance is 14 in. Four pneumatic counterbalances are provided to aid in returning the ram to the top of its stroke. Other features include air-electric clutch control, automatic overload clutch release, and dual ram-adjusting motors. Two-speed transmission permits operation at 5 or 20 spm. Approximate gross shipping weight is 354,000 lb.

NEW PRODUCTION and PLANT EQUIPMENT

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 89

Air-Powered Broaching Unit Fully Automated



Red Wing automated broaching fixture with pilot air valve sequencing controls

ALL motions on a new Red Wing automated, air-powered broaching fixture are performed by air-operated cylinders. Cycle sequencing controls are pilot air valves. No electrical controls of any type are required.

The new model broaches ½-in. wide flats on the ends of five inch long steel shafts of two different electric rotor assemblies, at a production rate of 720 pieces per hour. Automatic loading is provided by a magazine feed having three separate air-operated cylinders. Advance and return is controlled by a 6-in. diam, 25-in. stroke air-hydraulic cylinder mounted on the end of the fixture. A motorized coolant pump is included. All of the operations take place within a five-second operating cycle.

Standard air valves and cylinders are used throughout the fixture design. An emergency dump valve permits a pushbutton control to stop the sequence at any point. Start and stop controls are incorporated for operating the device, which requires a floor space of 40 by 140 in. and is 60 in. high. *National Broach & Machine Co.*

Circle 30 on postcard for more data

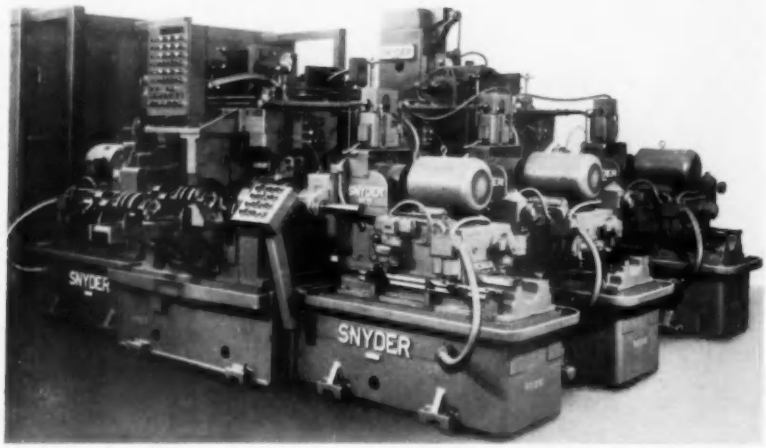
Thread Rolling Machine

MODEL 125A, planetary thread rolling machine thread rolls screws, bolts and nails at speeds of 600 to 800 pieces per minute. The unit handles overall blank stock lengths up to three inches and diameters from #4 to 5/16 in. Operations performed include thread rolling, roll forming, knurling, and marking.

Features of the machine include rear loading during production, cradled hopper with external drive free of obstructions and end mounted vibrator for peak efficiency. Also hardened and ground feed rolls, rapid adjusting feed rail width and micrometer feed-rail positioner. *Prutton Corp.*

Circle 31 on postcard for more data

Special Transfer Machine Handles 64 Engine Crankshafts Per Hour



Snyder 10-station segmented special transfer machine made up of three connected units

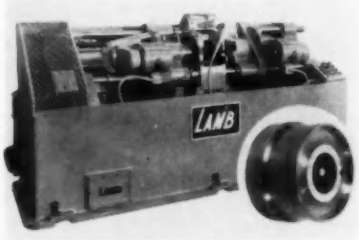
A TEN-STATION, segmented special transfer machine will drill, spotface, ream, tap and mill a keyway in automotive engine crankshafts at a net production rate of 64 pieces per hour. Tapped holes in the parts are blown out in process and inspected automatically by probe-type gaging fingers to check for through-drilling. The tapped holes are also blown out automatically after tapping.

The machine is made up of three segmented machining units connected by a transfer mechanism. This design is said to provide for easy tooling accessibility and to simplify problems of alteration for future design changes. Automatic lubrication systems are provided throughout the unit. *Snyder Tool & Engineering Co.*

Circle 32 on postcard for more data

Burnishing Machine

IN the automatic cycle of a new burnishing machine two opposing faces of a cast iron transmission drum are burnished at the rate of 360 pieces an hour. Microfinish is improved from 100 RMS to 15-25 RMS



Lamb automatic burnishing machine

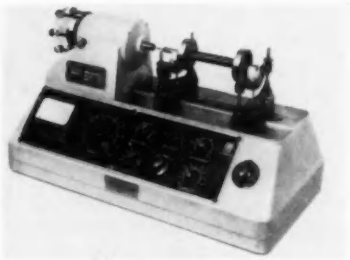
with minimum change in dimension.

Machine features include burnishing tool pressure equalization, minimum change in part dimension, maximum tool life and ease of part change. *F. Jos. Lamb Co.*

Circle 33 on postcard for more data

Unbalance Detector

BOTH angle and amount of unbalance can be indicated by a line of balancing machines designed for



Tinius Olsen Rava balancing machines

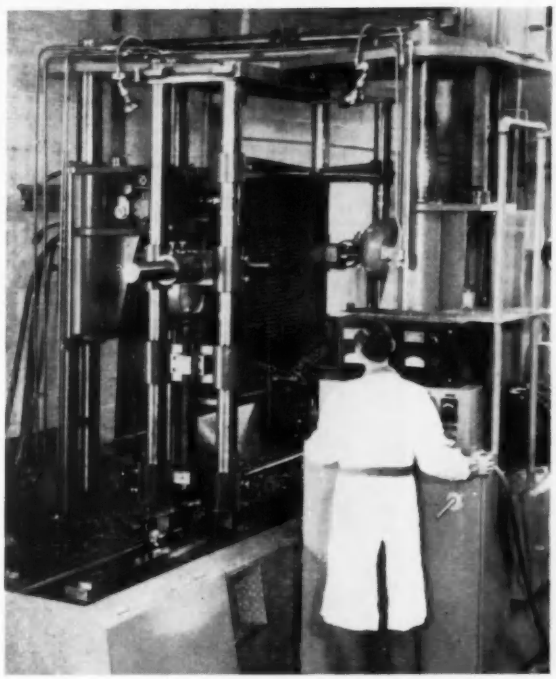
production and short run balancing. In operation, the work piece is rotated at speeds up to 3600 rpm by a direct motor drive using a universal joint. The piece is supported by two elastically mounted bearing surfaces which permit free movement of the rotor vertically and horizontally. This allows the part to rotate around its own center of inertia, causing it to act as an eccentric. This motion creates vibrations which increase as the eccentricity increases. These vibrations are transformed into electrical voltages and are compared in amplitude and phase with a standard voltage developed by a sine wave generator. Adjustment of simple electrical controls determines the position and amount of unbalance. *Tinius Olsen Testing Machine Co.*

Circle 34 on postcard for more data

Hardened Ground Steel Bedways

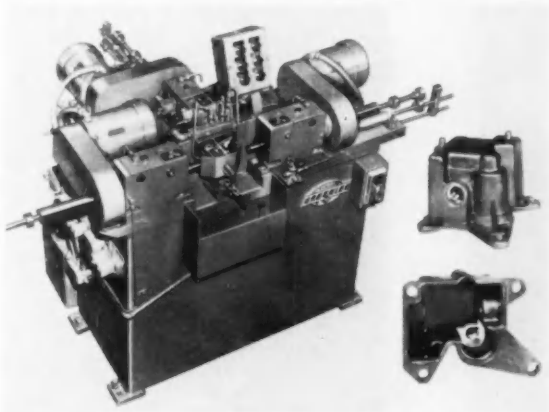
These aluminum bronze steel backed ways and hardened ground steel bedways shown mounted on an autoamtic opposed spindle drilling machine will not gall or score due to their extreme hardness (Rockwell 66C). This hardness is the result of a special process called the O-KNI-CO. Special analysis tool steel of any thickness is bonded to a soft, tough base producing a way that will not bow or warp. The hardening process to the full depth of the tool steel produces its wear resistant qualities. The aluminum bronze wear plates are made by the same process. (The Ohio Knife Co.)

Circle 35 on postcard for more data



Boring Machine for Machining Aluminum Die Castings

Greenlee Bros. three-station precision boring machine for machining aluminum die castings consists of three standard Greenlee Model S-6 Hydro-Borers mounted on a welded steel base

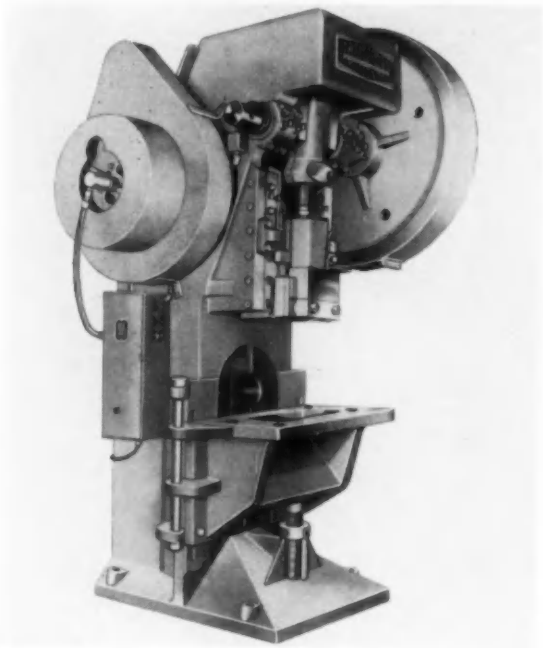


A SPECIAL purpose, three-station precision boring machine for machining aluminum die castings consists of three standard Greenlee Model S-6 Hydro-Borers mounted on a welded steel base. Two of the boring units are equipped with an air-operated, rapid-approach arrangement, which is designed to advance the boring spindle to the work piece.

The parts are loaded, machined, and unloaded in a cycle time of 30 seconds, or at a gross production rate of 120 pieces per hour. Features of the machine include an automatic operating cycle, pushbutton control for retraction of boring spindles at any point during rapid approach or machining cycle, and individual control at each station for tool setting. Boring spindles are fed into and through the work piece at a constant feed rate by the principle of oil displacement. A hydraulic pump is not required. *Greenlee Bros. & Co.*

Circle 36 on postcard for more data

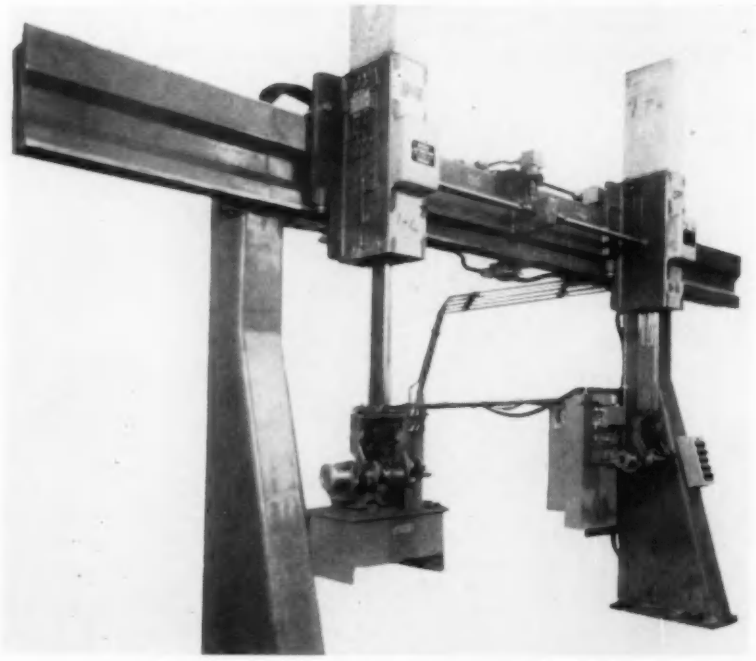
Sixty Ton Horn Press



This sixty ton horn press called the H-60 is being offered in both flywheel and single back gear models. Air clutch and electrical controls are standard features on the new units. Table distance with standard four inch stroke down and adjustment up is nine inches, with a maximum on special order up to 33 in. Crankshaft strokes up to 12 in. are also available. It is obtainable with horn and adjustable swinging table. (Johnson Machine & Press Corp.)

Circle 37 on postcard for more data

Loading and Unloading Device for Grinders



Wickes straddle type automatic loading and unloading device

AN automatic loading and unloading device can be used to automate standard grinders in transferring work to and from each grinder. The transfer unit includes its own hydraulic and electrical equipment and is tied into a grinder by a terminal for syncronized operation. It is built in capacities to meet requirements for each application. In one application it handles two 75 lb automotive crankshafts simultaneously.

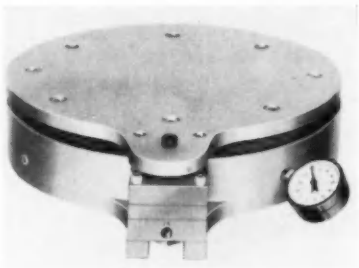
The unit is designed to straddle the grinder being serviced with a loading and unloading station at each side. In operation, each loading station lowers to pick up the work and raises and transfers it across and down into the grinding work area. Cycle time is 15 seconds. *Wickes Machine Tool Div.*

Circle 38 on postcard for more data

Machine Mounting System

PNEUMATIC machine-supports consisting of a simple air container of nylon-reinforced neoprene and cast aluminum, fitted with a pressure-indicating gage indicate load, maintain level and isolate vibration. In use, a unit is placed under each support point of a machine and connected to the factory air supply (100 psi).

The machine is actually supported on columns of air with no rigid connection between it and the floor.



Weber pneumatic machine-support

Pressure gage readings indicate machine weight supported by each unit. The new Air-Mounts are designed to support and indicate loads from 500 to 12,000 lb each with a 100 psi air supply. They can be moved from one machine to the other. *Weber Instrument Co.*

Circle 39 on postcard for more data

Cartridge Heaters

STAINLESS steel sheath cartridge heating units designed for use in heating dies, platens, molds, etc., where concentrated heat is desired and space is limited are available in all diameters and lengths. Units are sized to fit a drilled hole of the diam ordered. Thermal expansion forces the cartridge surfaces into positive firm contact with all surrounding surfaces for maximum heat surface. Voltages are 115 and 230 v, with special voltages available on request. *C&S Products Co., Inc.*

Circle 40 on postcard for more data

Punch Shaper

FORM and punch shaper K-150 makes irregular shaped stamping and electrode punches within precision tolerances of ±0.00025 in. It machines radii and angles automatically by employing a large dividing head with circular feed.

All work pieces are clamped directly in a collet holder, between centers or to the coordinate chuck. The coordinate chuck and indexing attachment guides the work piece along the contour with one chucking. Machine operations can be checked in the shaping process with the built-in 30 power microscope which also serves as a measuring device. *Jersey Mfg. Co.*

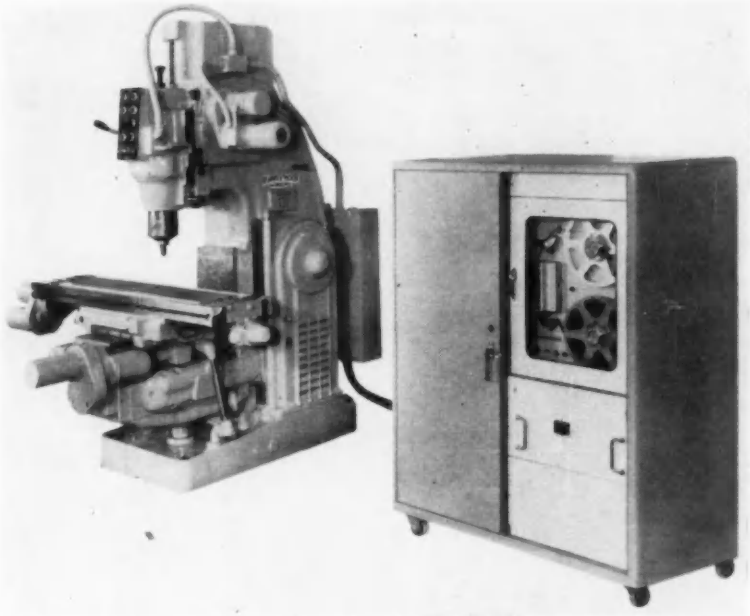
Circle 41 on postcard for more data

Fail-Safe Press Guard

THE curtain of light projector of a new press guard throws a broad beam of light (up to 18 in. high) across the danger area of the press. If this light curtain is broken at any place the press is stopped.

The equipment is fail-safe. It continuously and automatically checks its own operation. Consisting of a projector, a receiver and a control unit the curtain of light is primarily designed for use on presses that can be stopped instantaneously such as hydraulic or friction clutch machines. Three models are available in different curtain heights: 7, 13 and 18 in. high. *Electronic Control Corp.*

Circle 42 on postcard for more data



Kearney & Trecker vertical milling machine 2CH Vertical-ECS Tape System Special

Vertical Milling Machine With Numerical Control

DESIGNATED the 2CH Vertical-ECS Tape System Special, this knee-type vertical milling machine was designed with 16 spindle speeds ranging from 35 to 2100 rpm. It is equipped with ball-bearing lead screws and precision anti-backlash gear boxes for all three movements. Designed to mill ferrous and non-ferrous metals, the unit has a table 12 by 50 in. with a travel of 20 in. Maximum height under the spindle is 19¼ in. and vertical travel of cutter head is four in.

The control system uses punched tape instructions, a director that translates the tape commands into a magnetic control tape and a machine control unit of the closed loop servo type. Pushbutton power controls can be used in place of tape control if desired. *Kearney & Trecker Corp.*

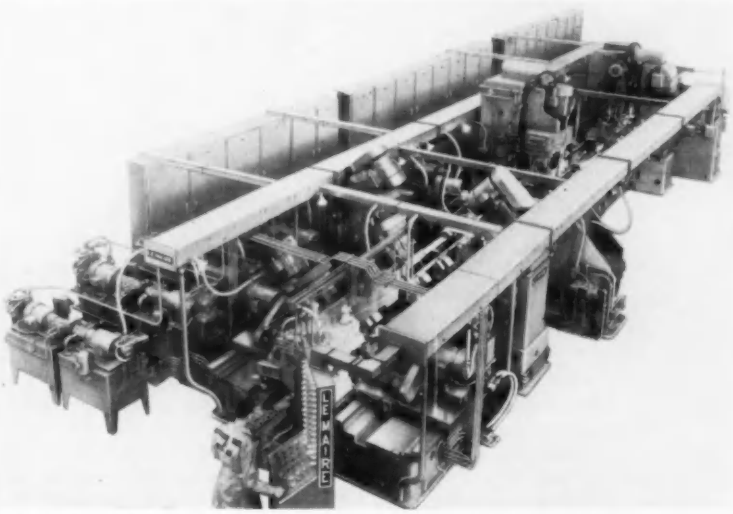
Circle 44 on postcard for more data

Line Transfer Machine Processes Three Different Manifold Castings

THIS 25-station line transfer unit machines V-8 engine intake manifolds at the rate of 65 per hour at 100 per cent efficiency. It is designed to accommodate two different size manifolds for a two-barrel carburetor along with a four-barrel manifold, both for truck engines.

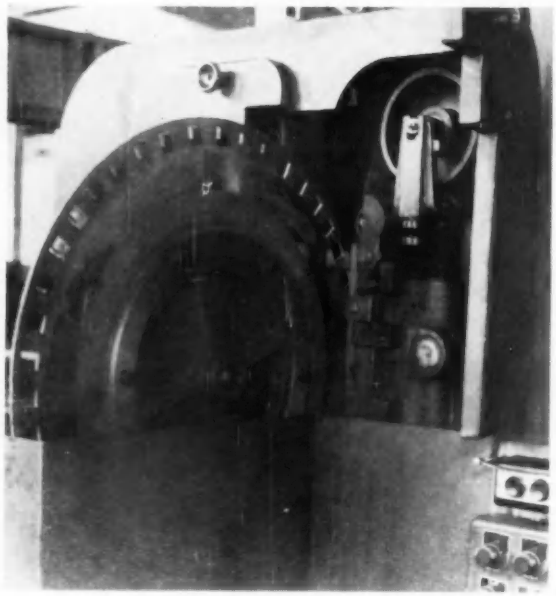
The machine is built for transfer-through operation, and features automatic locating and clamping at each work station. Other features of the unit include: unitized "building block" type construction, lighting at each work station, complete electrical interlock and individual selector switches and controls at each station. Twenty-two sub plates in three control enclosures house the electrical system which produces a total of 189 hp. Lubrication is automatic. *LeMaire Machine Tool Co.*

Circle 43 on postcard for more data



LeMaire transfer machine processes three different manifold castings in 25 stations

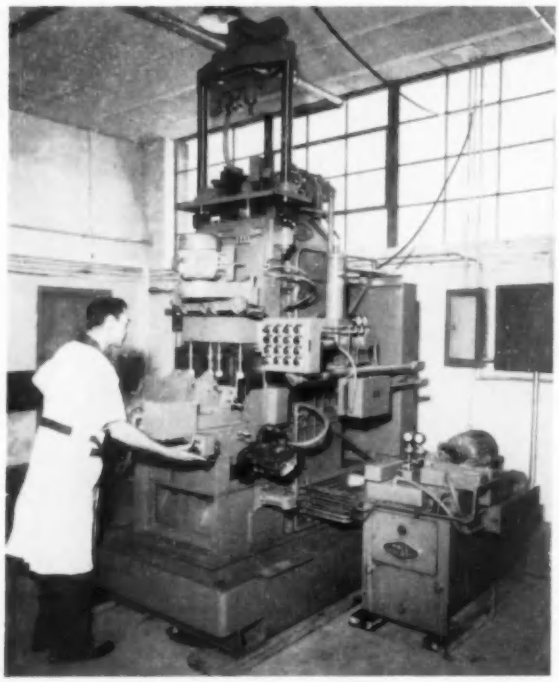
Twin Belt Surfacer



This rotary fixture was made for handling rectangular shaped thread chasers to be ground and polished after hardening. In a typical application such as a grinding or polishing operation on thread chasers or dies all pieces were finished within 0.0005 in. for size and parallel with stock removal 0.002 to 0.003 in. It was equipped with flat platens with a throated condition at each end. Number 180 grit aluminum oxide belts with proper coolants were used for this operation. (Production Machine Co.)

Circle 45 on postcard for more data

Multiple Spindle Valve Seat Grinder



Hall-Toledo Model H-7500 multiple spindle valve seat grinder incorporates the feature of automatic compensation for the grinding wheel material that is removed during the dressing operation

THE Model H-7500 multiple spindle valve seat grinder for quantity engine production is designed for cylinder head or block with 2-3-4-6-8-12 or 16 cylinders and will grind any valve seat material from cast iron through #1 stellite. The machine is capable of handling wheels of any angle with diam measurements of ¾ to 3½ in.

The grinder, depending on the number of cycles and degree of automation, is capable of grinding valve seats of 20 to 120 cylinder heads per hour at 100 per cent efficiency. Valve seat accuracy to within 0.002 in. total indicator reading and a depth line at seat reference point to within 0.002 in. can be obtained with this unit. *Hall-Toledo, Inc.*

Circle 46 on postcard for more data

Air Powered Tag Press

A NEW kind of metal tag producing press is a combination of a standard foot-press with a combination embossing, punching, blanking and flattening assembly in die-set. Power provided by an air cylinder arrangement permits its use from an ordinary air line of 75 psi or more.

Acromark metal tag producing press

Embossing and blanking pressure is sufficient for light gage aluminum, tin, terne plate, zinc, stainless or copper strip or sheet. Overall height of the press is about 64 in. and floor space required is about 22 by 28 in. not including the foot control valve. Weight is approximately 590 lb. *The Acromark Co.*

Circle 47 on postcard for more data

Dial Type Machines

TWO new dial type machines can process automobile valve rocker arms at the rate of 800 per hour. One machine drills and reams the rocker shaft hole, forms the oil grove and drills one oil hole. The other machine drills, chamfers and taps the adjusting screw hole; and drills, counterdrills and spotfaces a second oil hole. Both machines have six stations. Pushbutton-controlled power winches operate the fixture clamps. All standard and special parts of the two machines are completely interchangeable. *The Cross Co.*

Circle 48 on postcard for more data

Hydraulic Power Pack

A HEAVY duty hydraulic power pack for operation of fastener installation tools is designed to operate the Huck Model 146 Hydraulic driving tool. Designated Model 805 the unit is a portable electro-hydraulic generator.

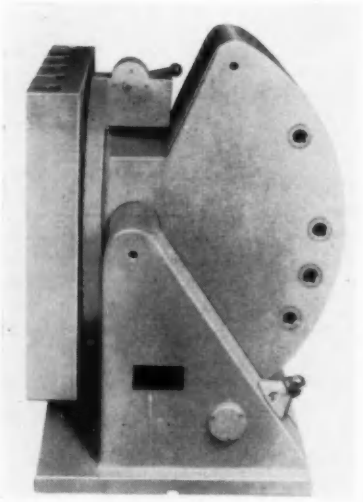
Operating at 3000 psi oil pressure, the new unit is capable of driving the tool at approximately 84 cycles per minute. It is rated at 2 hp at 1800 rpm and operates on 220/440 v, 3 phase, 60 cycle current. The hydraulic pump has a rated delivery of 3 gpm at 1800 rpm operation. *Huck Mfg. Co.*

Circle 49 on postcard for more data

Heavy-Duty Work Table

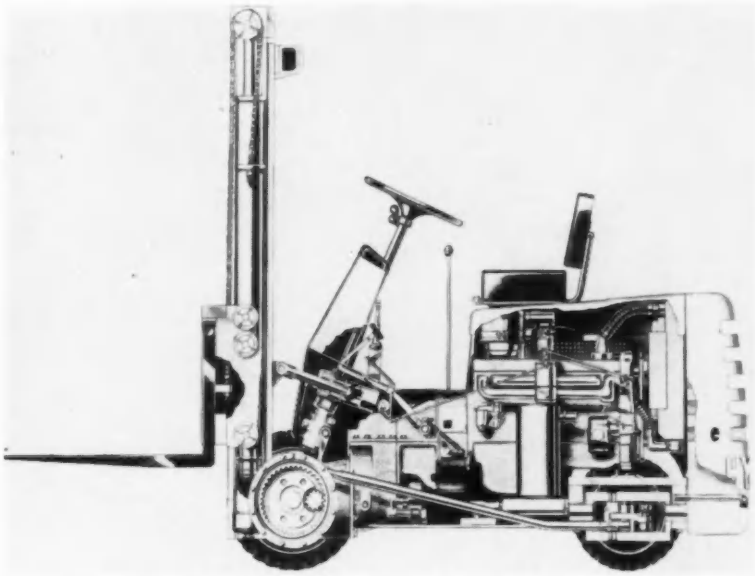
RADIAL drilling, tapping and boring operations can be accomplished on a heavy-duty work table that incorporates the means for both angular and radial positioning of work pieces. In addition to providing 360 deg of rotation and eight equally spaced locating holes, the cradle-type design of the table enables work to be tilted in a number of different planes, from horizontal to vertical.

The device consists of a heavy saddle equipped with three-inch pivot pins mounted in precision ball bearings, a semi-steel cradle equipped with precision-bored, hardened steel insert locating holes, and a standard precision-ground T-slot table which is 20 in. sq by 3 in. thick. *Galger Engineering and Mfg. Co.*



Galger "Tilt-A-Turn" work positioner table.

Circle 50 on postcard for more data



Hyster Space Saver model lift truck is equipped with self-adjusting, oversized brakes

Versatile Lift Truck With Power Shift Drive

A NEW line of cushion-tired lift trucks designed to perform under exacting space, speed and operating conditions includes 6000, 7000 and 8000 lb capacity models. Features of the trucks include a short turning radius, power steering as standard equipment, a high torque engine and the application of human engineering principles to the placement of controls and the seating of the operator.

Positive control of both inching and braking through the same foot pedal is accomplished through the design of the new transmission, named Power Shift Hystamatic, which is an optional item. Stacking aisle widths are 99½, 101 and 105½ in., for the 60, 70, and 80 models while the intersecting aisle widths are 71, 73, and 74 in.

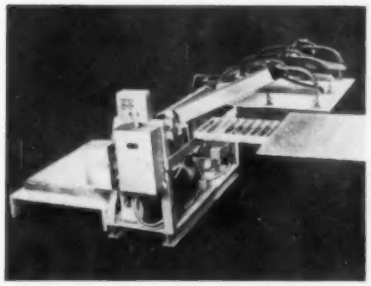
The engine is a large bore, low speed, L-head six, having a 226 cu in. displacement, and is rated at 70 hp at the governed speed of 2600 rpm and 168 lb-ft of torque at 1200 rpm. All fuel elements, including tank, pump and carburetion, as well as the air cleaner, are located on the left side of the block. All electrical elements are mounted on the other. *Hyster Co.*

Circle 51 on postcard for more data

Sheet Feeding Device

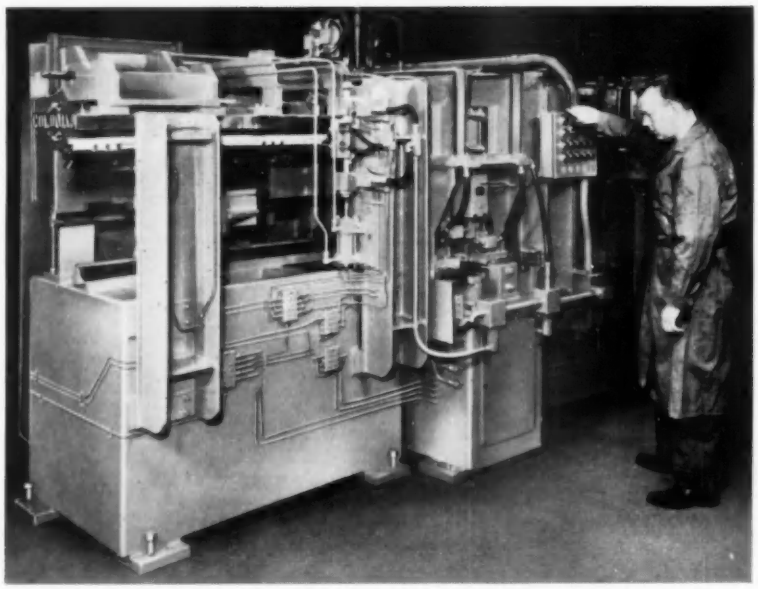
ITEMS such as plastics, metal and asbestos board may be handled by a versatile new sheet feeder designed to deliver sheets from piles to processing equipment. Sheets may be flat or formed (corrugated for example) and may be rectangular or irregularly shaped.

The machine will feed automatically upon receipt of signals from an associate machine, a timing device, a sheet sensing mechanism or from the feeder itself upon discharging a sheet. The feeding cycle also can be triggered manually by pushbutton control. The unit uses a "suction cup carrier" and a "carrier transfer frame" in delivering sheets to slitters, punch presses, forming machines and related machines. The device can feed from piles up to four feet high at speeds up to 15 sheets per minute. *The de Florez Co., Inc.*



de Florez versatile sheet feeding unit.

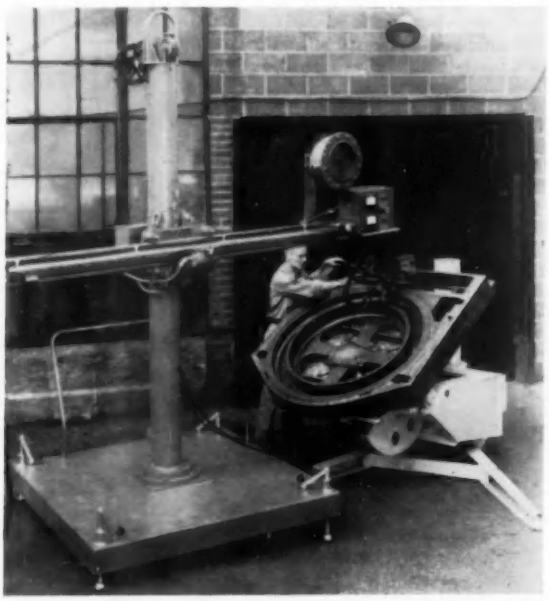
Circle 52 on postcard for more data



Broaching Unit for Cylinder-Block Bearing Surfaces

This horizontal broaching machine machines bearing lock surfaces of automotive cylinder blocks. Using automatic parts transfer, the machine broaches 180 parts per hour. Cycle time is 20 seconds. Broaching speed, using carbide inserts, is 60 sfpm. The machine is rated at seven ton with a 66-in. stroke. (Colonial Broach & Machine Co.)

Circle 53 on postcard for more data



Lewis mobile manipulator for diversified welding applications positions and pilots standard and automatic welding heads. The machines can be transported by fork lift truck or overhead crane if conditions do not permit manual movement by means of the wheeled base.

Mobile Automatic Welding Head Positioner

A NEW series of automatic welding head manipulators has been designed to position and pilot standard automatic welding heads. The "Bantam" manipulators are intended primarily for application with work-holding positioners or turning fixtures. They weld straight seams up to eight feet long and provide eight feet of under boom clearance.

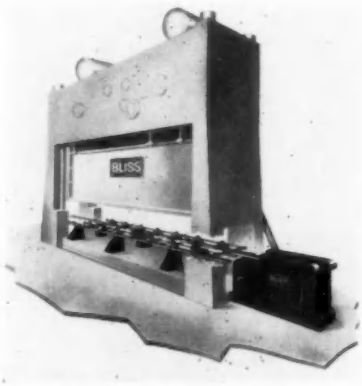
Features include 360 degrees of rotation of the boom, variable welding speeds up to 87 ipm and a base equipped with integral wheels and leveling screws for positive positioning. Boom-tip loads up to 250 lb can be handled. Longitudinal boom travel is controlled by an electrically driven mechanical variable-speed transmission, while boom elevation is controlled with a manual winch. Boom rotation is also a manual operation. *The Lewis Welding & Engineering Corp.*

Circle 54 on postcard for more data

Portable Transfer Feed

A SELF-CONTAINED transfer feed console can be used to convert straight side presses to an automatic transfer feed drive operation. It can also be used to move material through a series of presses. Operation is from one power take-off from the press crank, or it may be independently powered and set up to control the press cycle.

The feed stroke is adjustable from 15 to 30 in. in increments of one inch, and the light feed rails can be removed without disturbing die settings. The console is of welded construction, with tapered bearings at all points of support for rotating members, and an overall protective housing. *E. W. Bliss Co.*



Bliss portable transfer feed console

Circle 55 on postcard for more data

Control Lock

A SHEER action locking device holds control settings and is said to eliminate backlash and creepage. Developed originally as an aircraft throttle control, the vibration-proof automatic lock is applicable to the aircraft, automation and process industries and is available in a variety of sizes and models. The locking mechanism is light and compact and can be stacked for multi-control units on ½-in. centers. *Reid Metal Products, Inc.*

Circle 56 on postcard for more data

Trends in the CONSTRUCTION EQUIPMENT INDUSTRY

By Kenneth Rose

WITH the Federal Highway Program still well below its full volume of contracts let, it is encouraging to note that a few contracts are already being reported as completed. November, 1957, saw the completion of 98.8 miles of highway on the Interstate System, bringing the total of completions to 1209 miles since the beginning of the program July 1, 1956. The cost of these projects was $247,606,000. Some of these were authorized under earlier Federal aid acts.

During the month of November construction was begun upon 34.7 miles of Interstate Highway bringing the total under construction to 1957.7 miles. Total cost of this construction will be $1,045,-972,000. Mileage programmed as of the end of November is 4437.4, to cost $3,435,014,000. Preliminary engineering and right-of-way acquisition authorized to the end of November totals $954,118,000.

Shipments of Equipment Fall Off

Reports from the Bureau of the Census upon shipments of excavating and earthmoving equipment except power cranes and shovels, for the third quarter of 1957 show a decrease of 20 per cent below second quarter shipments. Value of third quarter shipments was $181 million as compared with second quarter's $227 million. Shipments of road construction and maintenance machinery declined 14 per cent and trawler tractors declined 22 per cent.

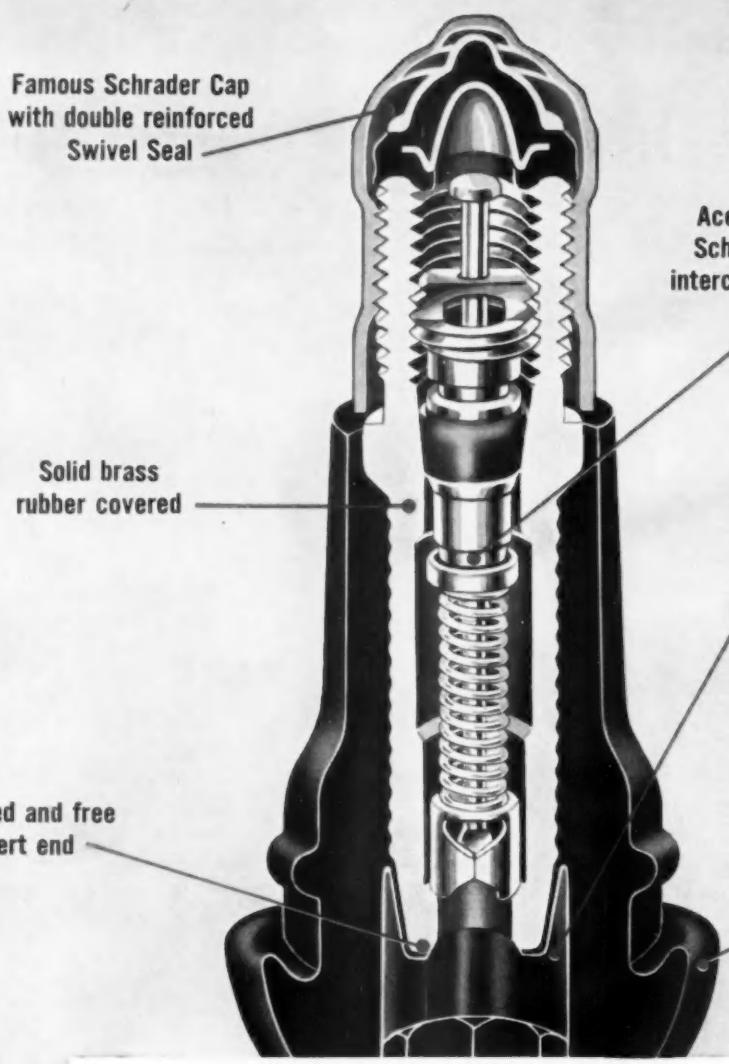
More Federal Aid for Roads Recommended

Both Sen. Albert Gore, chairman of the Senate Roads Subcommittee, and Rep. George H. Fallon, chairman of the House Roads Subcommittee, spoke at the meeting of the American Association of State Highway Officials in Chicago. Rep. Fallon said he planned to recommend that Federal Aid funds for primary and secondary roads

(*Turn to page* 134, *please*)

LeTourneau-Westinghouse 18-cu yd scraper

Fork lift machine made by R. G. LeTourneau, Inc.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Free INFORMATION SERVICE

Use either of these postcards for Free Literature listed below, or for more information on New Production Equipment and New Products described in this issue.

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FREE LITERATURE

High-Temperature Alloys 1

Two 28 page properties booklets give details on "Haynes" alloy 25 and "Hastelloy" alloy X which have applications in the jet engine and heat-treating fields respectively. *Haynes Stellite Co., Div. of Union Carbide Corp.*

Diaphragm Seals 2

Diaphragm seals designed to protect pressure instruments against corrosion and clogging are described in Bulletin 250. *Brooks Rotameter Co.*

Springs 3

Belleville springs are described in a 16 page technical brochure. Various end uses along with formulae and design data are given. *The Union Spring and Mfg. Co.*

Transfer Machines 4

Numerous line and rotary transfer machines are described in a 12 page booklet. Standardized assemblies and components for economy in the design of special machine tools are also pictured and described. *The Producto Machine Co.*

Controls 5

Bulletin J-101 includes information on the Shaftrol and Valvetrol shaft-mounted positioning gearmotors for valves, drives, pumps and other applications. *The Jorden Co., Inc.*

Oil Distributor 6

A solenoid operated lubricator developed to distribute lubricating oil from a self-contained reservoir or from reservoirs in the machine itself is described in a technical reference offered by *Bijur Lubricating Co.*

Speed Control Drives 7

Packaged drives for equipment requiring adjustable speed or speed synchronization are described in eight page bulletin 20,000. Major components are pictured and described. *Clark Controller Co.*

Welding Equipment 8

Form ADC 848B, 48 pages, contains information on supplies and accessories for gas and arc welding. *Air Reduction Sales Co., Div. of Air Reduction Co., Inc.*

High Temperature Springs 9

How to design and select materials for springs that must operate successfully at high temperatures is the subject of an eight-page bulletin published by *Associated Spring Corp.*

Worm Gearing 10

Bulletin CD-200 presents information on the design and application of double-enveloping worm gearing, 24 pages. *Cone-Drive Gears Div., Michigan Tool Co.*

(Please turn page)

VOID After Mar. 15, 1958 **1/15/58**

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Surface Grinders 11

A line of hydraulic surface grinders are listed in a 29 page bulletin. Horizontal spindle, vertical spindle and extra heavy duty double housing models are included as well as special precision way grinders. Tables range from 8 to 40 ft in length. *The Hill Acme Co.*

Power Transmission 12

Bulletin F-10, four pages, lists types of shafts and couplings and general conditions where shafts and couplings should be considered. Eight page bulletin F-11 contains engineering data to assist in the selection and installation of shaft couplings designed to couple an engine or motor to drive other machinery. *H. S. Watson Co.*

Machining Thermoplastics 13

An eight page booklet outlines recommended procedures for machining and finishing of thermoplastics sheets, rods and tubes. Special machining characteristics of acrylics, nylon, fluorocarbons and polyethylene are also covered. *Cadillac Plastic & Chemical Co.*

Gas Welding Catalog 14

Revised Catalog 160, 36 pages, covers a line of welding and cutting equipment including oxy-acetylene welding and cutting torches, welding regulators, industrial regulators, pressure gages and related equipment. *Modern Engineering Co.*

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Microhoning Process 15

The Microhoning process plus capacities and specifications of a representative range of equipment including machines, tools, fixtures, abrasives and coolants for cylindrical, spherical and flat applications is described in a 32 page service and equipment catalog prepared by *Micromatic Hone Corp.*

Foot Squaring Shears 16

Bulletin 80-FC illustrates and describes the design and operating features of a line of foot squaring shears for light metal working. Cutting lengths and capacities of all models are given in a full page of specifications. *Niagara Machine and Tool Works.*

Speed Drive 17

Bulletin 2000, 12 pages, contains information on an adjustable speed drive, available from 5 to 200 hp. The ac powered unit has applications in machine tools, metal processing, conveyors and similar equipment. *The Louis Allis Co.*

Ram Type Turret Lathes 18

Form 1182-A, a catalog for automatic ram type turret lathes covers specifications, operation and additional special functions of a line of turret lathes with hydraulic drive. *Gisholt Machine Co.*

Centrifugal Pumps 19

An illustrated catalog data sheet provides information on a line of electric-driven self-priming centrifugal pumps. The pumps offer capacities up to 1600 gpm. *Barnes Mfg. Co.*

Ceramic Inserts

Ceramic VR-97, triangular and square throw-away inserts, described in four page folder 5710, have the ability to cut hard to machine metals and are capable of speeds of 2000 sfpm and up, with feed cuts to 0.20 in. and cuts to ⅜ in. depth. Address request on company letterhead to *Vascoloy-Ramet Corp., Waukegan, Illinois.*

Cleaning Machines

Catalog 951-D, 32 pages, covers a line of airless blast cleaning machines as well as wet blast, air blast and dust control equipment. Also included are cast steel shot and grit abrasives, sandcutters and core rod straighteners. Address request on company letterhead to *Wheelabrator Corp., 1011 S. Byrkit St., Mishawaka, Indiana.*

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Cracked shaft in Valdosta . . . His job: get a new one down to Georgia by tomorrow noon. It's an emergency case, but it's not as tough as it sounds.

He's backed by the press industry's largest parts department . . . by a million dollar parts inventory in two plants . . . by telephone and Teletype tie-ups between Parts Headquarters in Hastings, Michigan and Toledo and local sales and service centers throughout the country.

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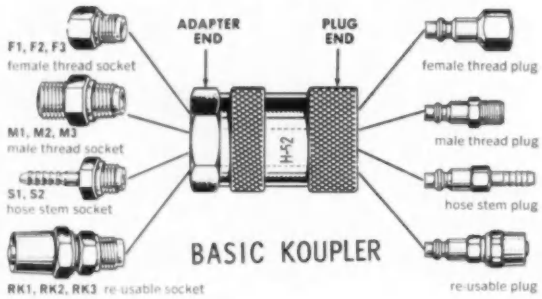
NEW PRODUCTS AUTOMOTIVE-AVIATION

FOR ADDITIONAL INFORMATION, please use reply card on PAGE 89

Swivel Head Featured On Interchangeable Hose Coupler



Hofmann H-52 Quik-Koupler designed for use with industrial vinyl hose permits immediate change to any type of connection. Capacity is up to 125 psi. Washer is of Buna "N" rubber. Assembly can be made in the individual plant maintenance department and one coupling can be used for a variety of hookup applications.

The H-52 "Quik-Koupler" was designed for use with industrial vinyl hose. It is also suitable for use with rubber or composition hose and is interchangeable with most major coupling lines. The swivel head and positive locking action are special features. Sockets are of brass, with stainless steel ball springs, balls and valves.

Plugs are available in cadmium plated, hardened steel for air and oil use or in all brass construction for corrosive fluids. Capacity is up to 125 psi. *Hofmann Engineering Co.*

Circle 60 on postcard for more data

Self-Tightening Clamp

Constant concentricity is the feature of a self-tightening hose clamp that consists of a single steel ring

which exerts a constant 360 degree squeeze on flexible tubing. Applications for the clamp include those in the automotive and aviation fields as well as on pneumatic and hydraulic cooling lines in the metalworking, electronics and power equipment industries. Vibrations and shocks only tend to tighten the clamp, thus eliminating the need for periodic tightening operations. *Corbin Hose Clamp Div., The American Hardware Corp.*

Circle 63 on postcard for more data

Solenoid Valve

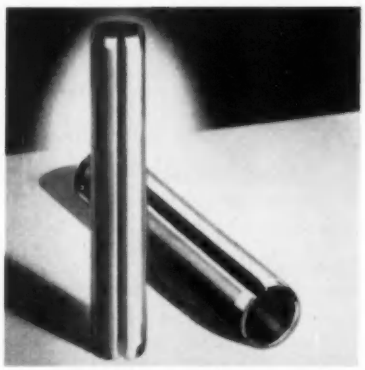
Beam Products Mfg. Co. is offering a compact universal 6 or 12 v-dc solenoid valve which may be used on either voltage. The valve, Model GT-622, weighs 11 oz and measures 2¾ in. in length and is of straight-through design. It has a ⅛ in. pipe connection and may be used as a gasoline shutoff.

Circle 61 on postcard for more data

Copper Spring-Pins

Self-locking spring-pin fasteners made of beryllium copper provide a vibration proof fastening method. They are non-sparking, non-magnetic and have high conductivity features. Designated the Sel-Lok, the pin is an axially slotted tubular pin that locks by spring action when driven into an ordinary hole.

Nominal diameter sizes ranging from 0.062 to 0.250 in. are available.



Lengths range from 3/16 to 4 in. Length tolerances are from plus or minus 0.015 in. to the smallest sizes to 0.030 in. in the largest sizes. Hardness of beryllium copper spring pins is Rockwell "C" 36-42. *Standard Pressed Steel Co.*

Circle 62 on postcard for more data

Accelerometer

Applications of a self-calibrating accelerometer designed primarily for control and guidance in aircraft and missiles include fire control, servo guidance and pitch and yaw correction characteristics. Designated Model ADT-905, the unit is equipped with a self-contained calibration system which can be used to check the operation of the accelerometer while in use, or to calibrate the device statically or dynamically.

The unit incorporates the use of a force generating device which applies a force to the seismic system in proportion to the electrical excitation applied. The device is inherently stable over the entire temperature range of —65 to 250 F. *Gulton Industries, Inc.*

Circle 64 on postcard for more data

Immersible Motor

An immersible motor designed for close-coupling to agitators or pumps in chemicals and abrasive industrial

oils is available in ratings of ¾ to 40 hp, both single and polyphase. In applications, the flange-mounted motor eliminates many connecting components since the motor shaft is directly attached to the impeller.

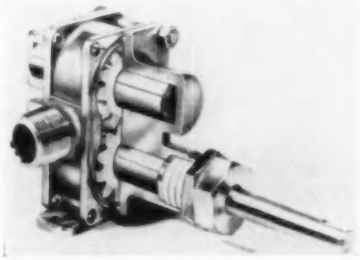
Features include leak-tight construction, neoprene breathers, oil filled at factory, waterproof cable connection and corrosion resistant parts. It is engineered for submerged pumping service, mixers, agitators and special applications. *The Louis Allis Co.*

Circle 65 on postcard for more data

Self-Priming Gear Pump

Named GearChem, a self-priming rotary gear pump suitable for nonlubricating and corrosive fluids features housings of 316 stainless steel or Hastelloy C with Teflon gears and internal Teflon bearings and packing. It is designed to operate at 1750 rpm with fluids of low viscosity, at capacities to 10 gpm and pressures to 100 psi. Fluids with viscosities to 5000 SSU can be pumped at reduced speeds.

In addition to proportioning and metering applications, this continuous



duty pump is suited for general process work in pilot plant and production operations. Spur gear design permits reversible rotation. *Eco Engineering Co.*

Circle 66 on postcard for more data

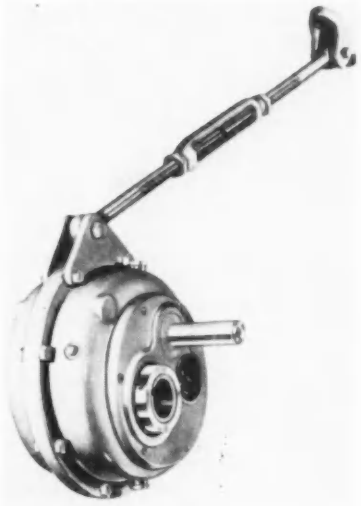
Rubber Tired Wheels

To eliminate shearing strain on the bolts and to simplify assembly, the two sections of a line of demountable rubber tired wheels are keyed to fit. The hub is an integral part of one flange. It is said to be impossible for the hub to become loose between the flanges. The tread of the tire is mounted permanently to a hard base. The wheels are available with soft G-1 compound, hard G-2 compound and G-3, oil resisting neoprene compound. *Bond Foundry & Machinery Co.*

Circle 67 on postcard for more data

Mounted Gear Reducer

A shaft mounted gear reducer said to eliminate the need for motor bases, rails, supporting structures and flexible couplings provides a com-



pact transmission unit for many industrial applications. Eighteen models, including single and double reduction types, are available.

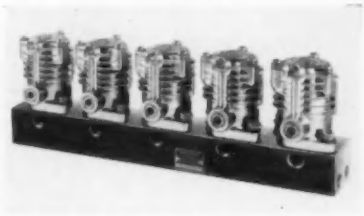
For applications such as inclined conveyors, horizontal mixing drums, etc., where protection against reversal of direction is required, a roller backstop can be furnished. Torque reaction brackets can also be furnished for units with platform-mounted or reversing drives. *Lovejoy Flexible Coupling Co.*

Circle 68 on postcard for more data

Multi-Station Manifolds

A line of compact multiple station manifolds designed to provide efficient mounting of Valvair solenoid pilot valves eliminates the need for separate sub-bases. The devices, of aluminum bar stock, are offered in two, three, four and five station types.

Common inlet, exhaust and individual cylinder ports are tapped ¼ in.



NPT. Conduit outlets are ½ in. NPT. Manifolds have three tapped holes on the underside for mounting and are designed to accommodate either three-way normally open or three-way normally closed pilot valves in unmixed groups. *Valvair Corp.*

Circle 69 on postcard for more data

Air, Hydraulic Cylinder

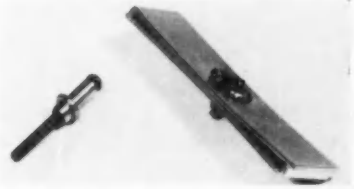
A line of air and hydraulic cylinders for heavy-duty service developed for automotive industry automation standards is rated at 1000 psi hydraulic, 200 psi air, and for nonshock load up to 1500 psi hydraulic. Designated the Hydro-Line Series "S2," they meet JIC specifications.

Nine bore sizes ranging from 1½ to 8 in. are obtainable in a choice of 11 standard mountings. Two piston designs are available and both types are piloted to the rod and locked positively with self-locking nut. *Hydro-Line Mfg. Co.*

Circle 70 on postcard for more data

High-Strength Fastener

Widespread gripping leaves of a steel fabricated blind rivet make hole size a noncritical design consideration.



Suited to all types of light steel metal applications such as truck-trailer applications and duct work, the new fastener is installed with standard pneumatic tooling. A swaged positive mechanical lock insures pin retention. Named the Daisy, the fastener is available in two lengths to satisfy a variety of requirements. *Huck Mfg. Co.*

Circle 71 on postcard for more data

The BUSINESS PULSE

Vital Areas of Uncertainty in the Economy Are the Buying by Consumers Early in the Year and Federal Spending During the Latter Part. Outlook for Inventories Is Improved by Cautious Policies Pursued During 1957.

The latter part of 1957 was characterized by certain unfavorable developments which are now casting a shadow of uncertainty over the outlook and are causing businessmen to view 1958 with caution.

Gross national product rose to a new annual record in 1957, but unfortunately the greatest part of the increase reflected higher prices rather than an appreciable advance in the real volume of economic activity. Real growth fell short of what has been historically normal for the American economy so that neither consumers nor businessmen experienced much improvement in their position.

Moreover, poor growth performance was only part of the unsatisfactory 1957 story. Of even greater significance in the near-term outlook was the appearance of recessionary tendencies in the economy, which by the year's end had become generalized and well defined. Definite confirmation of the downtrend was provided by the continuing decline through November of such indicators as industrial production, retail trade, personal income, and aggregate employment.

Clearly, the economy is headed for a test in 1958, and more and more it looks as if the outcome would turn upon the performance of consumers in the early part of the year and on the magnitude and rapidity of any rise in Federal spending during the latter part of the year. These are the vital areas of uncertainty. Prospects in other sectors seem more definite.

This Survey Is Prepared Exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Company of New York.

Downward Influence On GNP

If the expected minuses of capital spending, net foreign investment, and inventories are set against the expected gain in outlays by State and local governments, the net resultant is a downward influence of GNP in 1958 of several billion dollars. Those who are most optimistic about business prospects in 1958 make the point that such a figure is relatively small and could easily be dwarfed by increases in Federal outlays and in consumer spending for goods, services, and homes. Admittedly, this could happen, but the emphasis has to be placed on "could."

It will obviously be some time before plans for a larger defense program can be translated into actual dollars-and-cents expenditures. Moreover, it is not yet clear how much of an increase is ultimately in store, since Administration plans apparently have not fully crystallized and since Congress will have much to say about the matter after it reconvenes. It is perhaps reasonable to guess that Federal outlays will be higher by $1½ billion to $2 billion in the second half of 1958, but it is difficult to see much acceleration before then. This means that the possibility of offsetting weaknesses in capital spending and elsewhere will rest mainly with the consumer in the early part of the year. If the consumer should be liberal with his spending dollar, recessionary tendencies could very well be short-lived. If he should be cautious and hesitant, the scope and duration of the readjustment could be substantially increased.

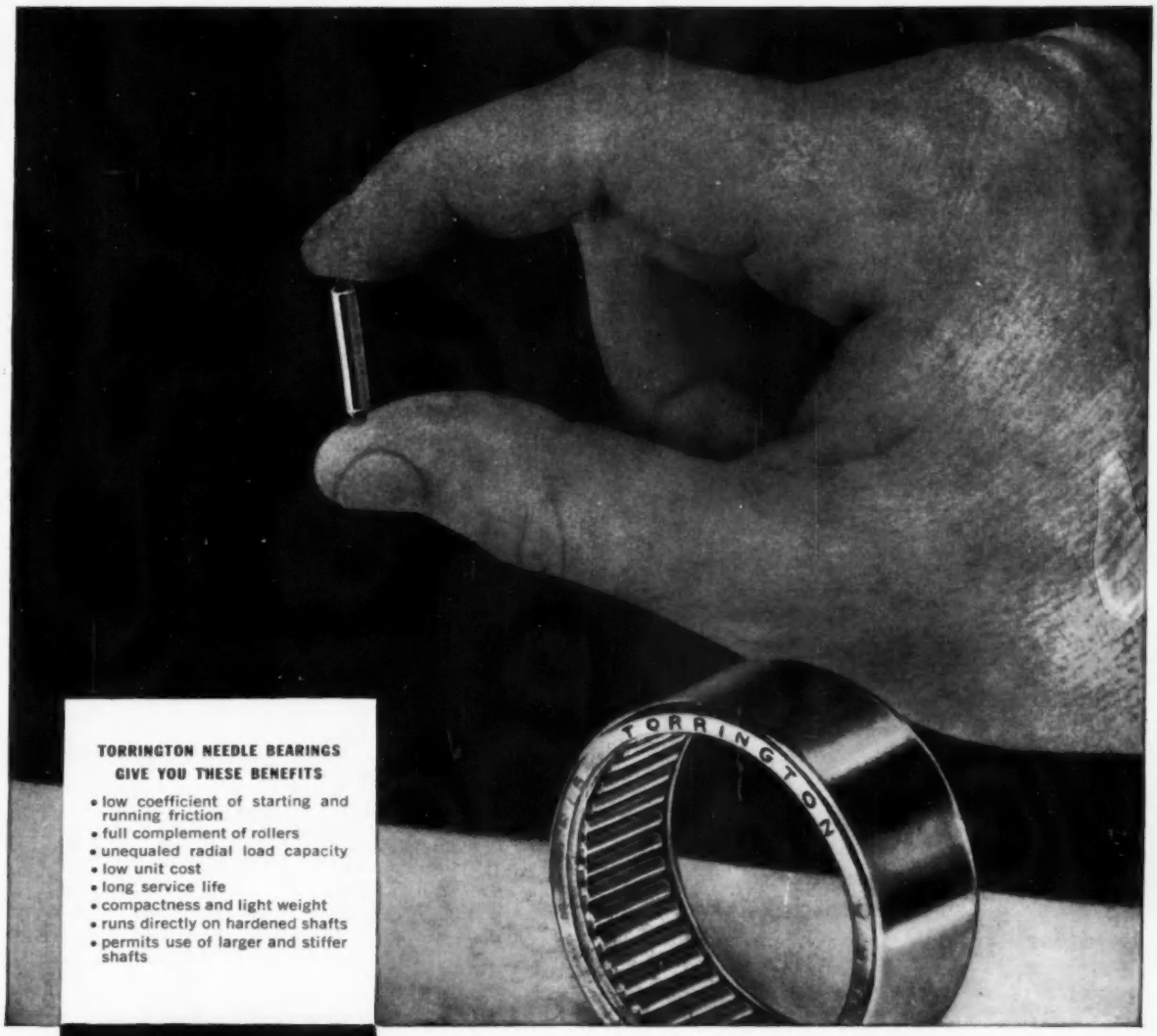
Retail Sales

Just now the outlook on this score is decidedly cloudy. Recessionary psychology, along with the reduction in overtime pay and some layoffs, appears to have affected retail trade during the autumn and early winter. The Department of Commerce reported consecutive monthly declines in the seasonally adjusted total of retail sales for September, October, and November, with the setback embracing both durable and nondurable goods. Reports for December sales are incomplete, but it seems doubtful that any dramatic improvement occurred.

The whole issue of consumer spending, in other words, is very much in doubt at present. This statement covers consumer purchases of homes as well, since there is no logical reason to assume that this area is immune to shifts in psychology.

The uncertainty which overhangs the vitally important area of consumer spending shows that there is little merit in the forecasting approach that involves independent estimates of various components of GNP and then proceeds to an algebraic summation. The fallacy lies in the interre-

(*Turn to page* 130, *please*)



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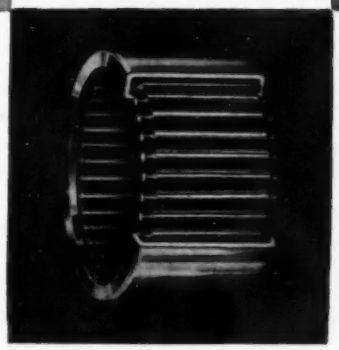
- low coefficient of starting and running friction
- full complement of rollers
- unequaled radial load capacity
- low unit cost
- long service life
- compactness and light weight
- runs directly on hardened shafts
- permits use of larger and stiffer shafts



Close-up of precision!

This Needle Roller, key to the operation of the Torrington Needle Bearing, is a microscopically precise example of Torrington craftsmanship.

In every manufacturing step, from selection of bearing materials to final polishing, these rollers are checked with strict quality control.

A full complement of rollers, mounted in a precision-made, case-hardened retaining shell, provides a maximum number of contact lines, giving the Torrington Needle Bearing a higher radial load capacity than any other anti-friction bearing of comparable size. Rollers operate smoothly with low coefficient of starting and running friction.

Torrington's experience with Needle Bearings spans the history of their development for thousands of successful applications. In seeing that you get every last ounce of performance these unique bearings can deliver, your Torrington representative is an expert: call on him at any time. *The Torrington Company*, Torrington, Conn.; South Bend 21, Ind.

TORRINGTON BEARINGS

District Offices and Distributors in Principal Cities of United States and Canada

NEEDLE ROLLERS • SPHERICAL ROLLER • TAPERED ROLLER • CYLINDRICAL ROLLER • NEEDLE • BALL • THRUST

AIR BRIEFS

By RALPH H. McCLARREN

Analysis of Missile Spending

We have received many inquiries of late concerning the missile program, how many missiles and what proportion of funds are expended for engines, electronics, airframes, etc. Concerning the latter, some interesting information has been made available by the U. S. Air Force.

Of all the money spent by the USAF between fiscal 1946 and fiscal 1958 ($4.5 billion) for missile research, development and production, 35 per cent went for airframes, 20 per cent for propulsion systems, 20 per cent for guidance and control, 10 per cent for military construction, 8 per cent for nose cones, 6 per cent for industrial facilities used by contractors and 1 per cent for miscellaneous charges.

If the USAF figures are equally applicable to spending by the other military services—which is quite probable—it means that of the total of about $7.5 billion spent on all types of missiles by all services during the 13 years, the sums broke down this way for the Department of Defense as a whole: Airframes, $2,625,000,000; engines, $1,500,000,000; guidance and control, $1,500,000,000; military construction, $750 million; nose cones, $600 million; industrial facilities, $450 million and $75 million for miscellaneous procurement.

The above figures are all inclusive. For a production operation only, excluding research, development and flight testing costs, the percentages for an air-to-air missile are as follows: airframe—12.5 per cent; solid rocket propellant engine—6.5 per cent; mechanical mechanisms such as gyros, accelerometers, hydraulic servos, switches, etc.—33 per cent; electronics—43 per cent; electrical power source—1.5 per cent; and non-nuclear warhead—3.5 per cent.

Note in particular the high percentage of cost for mechanisms and electronics; a total of 76 per cent.

Annual Meeting of IAS

Air and space scientists and engineers (some 2500) will convene Jan. 27-30 for the Institute of the Aeronautical Sciences 26th Annual Meeting at New York City. More than 100 technical papers on the science of flight will be heard at 25 technical sessions. These will include aerodynamics, earth satellites, rotary wing aircraft, flight safety and education.

Currently "hot" subjects will be represented in sessions on space propulsion, missiles and missile propulsion, hypersonic aerodynamics, missile structures, space medicine and gravity. W. Stuart Symington, U. S. Senator (Missouri), will be the principal speaker at the Honors Night Dinner, Jan. 28. Toastmaster Mundy I. Peale, retiring IAS president, will present the Institute's honors and awards and also announce the election of 1957 honorary Fellows and Fellows.

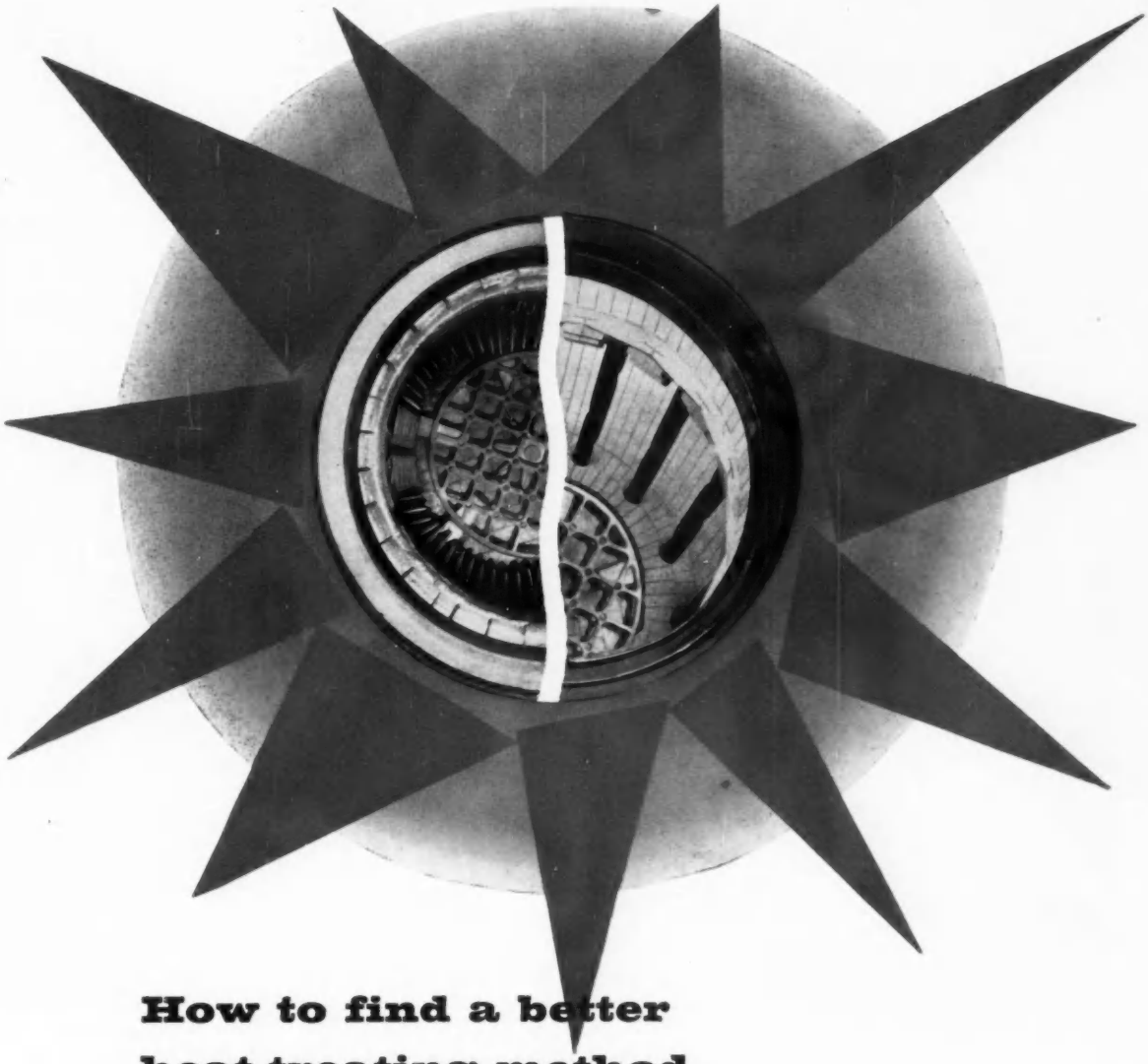
High Temperature Grease

A new class of greases for high temperature applications has been developed by the Shell Oil Co. The new lubricants, called Shell ETR (extreme temperature range) greases, withstand temperatures up to 600 F and protect metal parts running at speeds up to 30,000 rpm, according to company releases.

(*Turn to page* 104, *please*)

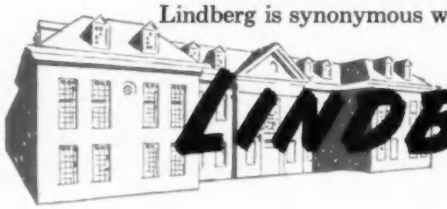
INTERNATIONAL AND DOMESTIC SCHEDULED AIR SERVICE REVENUE TRAFFIC

Year	Miles Flown	Hours Flown	Passengers Carried	Passenger-Miles	Cargo Ton-Miles	Mail Ton-Miles	Average Number of: Passengers per Aircraft	Average Number of: Miles Flown per Passenger	Average Number of: Miles Flown per Hour
	Millions								
1957	1,760	8.8	87	51,000	1,150	300	29	585	200
1956	1,580	8.0	77	44,000	1,030	280	28	575	200
1955	1,430	7.4	68	39,000	910	260	27	570	195
1954	1,290	6.7	58	33,000	770	230	26	565	190
1953	1,190	6.4	52	29,000	720	190	24	560	185
1952	1,100	6.0	46	25,000	680	180	23	545	183
1951	1,010	5.6	42	22,000	640	170	22	520	180
1950	890	5.0	31	17,000	530	140	19	540	177
1949	840	4.8	27	15,000	390	130	18	545	175
1948	790	4.6	24	13,000	290	120	17	550	170
1947	710	4.2	21	12,000	180	90	17	560	165
1946	580	3.8	18	10,000	80	70	17	530	155
1945	370	2.5	9	5,000	70	90	13	545	150



How to find a better heat-treating method

Here's a sound way to do it. Take your problems to the people who have consistently, over the years, provided the metal treating industry with new and better ideas, more efficient, more practical equipment. This will bring you to Lindberg, creators of the famous Cyclone type atmosphere furnaces, the long-life "dimple" vertical radiant tube, the revolutionary new CORRTHERM electric heating element and so many other innovations in better heat treating methods. Lindberg is synonymous with heat treating furnaces. We build them for carbonitriding, carburizing, hardening, tempering, normalizing, bright stainless annealing, brazing, carbon correction, nitriding, or any other metal treating requirement. Give your production processes the advantages of Lindberg's forward look in "heat for industry" techniques. Get in touch with your nearest Lindberg Field Representative (See classified phone book) or write Heat Treating Furnace Division, Lindberg Engineering Company, 2491 W. Hubbard St., Chicago 12, Illinois.



LINDBERG heat for industry

News of the
MACHINERY INDUSTRIES

(*Continued from page* 79)
ports that despite a decided slump both in new orders and shipments during the latter half of the year, the 1957 business of the contract tool and die industry will undoubtedly be the next to the best year ever—second only to 1956.

Outlook for 1958

Capital Goods

The latest survey of the U. S. Department of Commerce and the Securities and Exchange Commission indicates that U. S. plant and equipment outlays in the 1st quarter of 1958 will be at a seasonally-adjusted annual rate of $35.5 billion—five per cent below the quarterly average for 1957 but somewhat higher than the $35 billion total of such expenditures in 1956. Capital expenditures by motor vehicle producers are expected to take another substantial dip, with the 1st quarter of 1958 estimated at $193 million—equivalent to a seasonally-adjusted annual rate of about $840 million.

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TULSA® POWER TAKE-OFF

Years of engineering mastery, manufacturing experience and tough field testing have proved the unequaled quality of Tulsa Power Take-Offs. Precision-made . . . compact . . . powerful, durable and quiet . . . Tulsa Power Take-Offs are foremost with these outstanding features . . . shaved and heat-treated gears, hardened shifter yokes; anti-friction bearings throughout; strong, lightweight heat-treated aluminum housings . . . extremely low prices with nationwide distribution and service. Tulsa assures you unequaled quality in Power Take-Offs sized from single speed, medium duty to multiple speed, heavy duty models.

Tulsa Winch
TULSA, OKLAHOMA DIVISION OF VICKERS Inc.

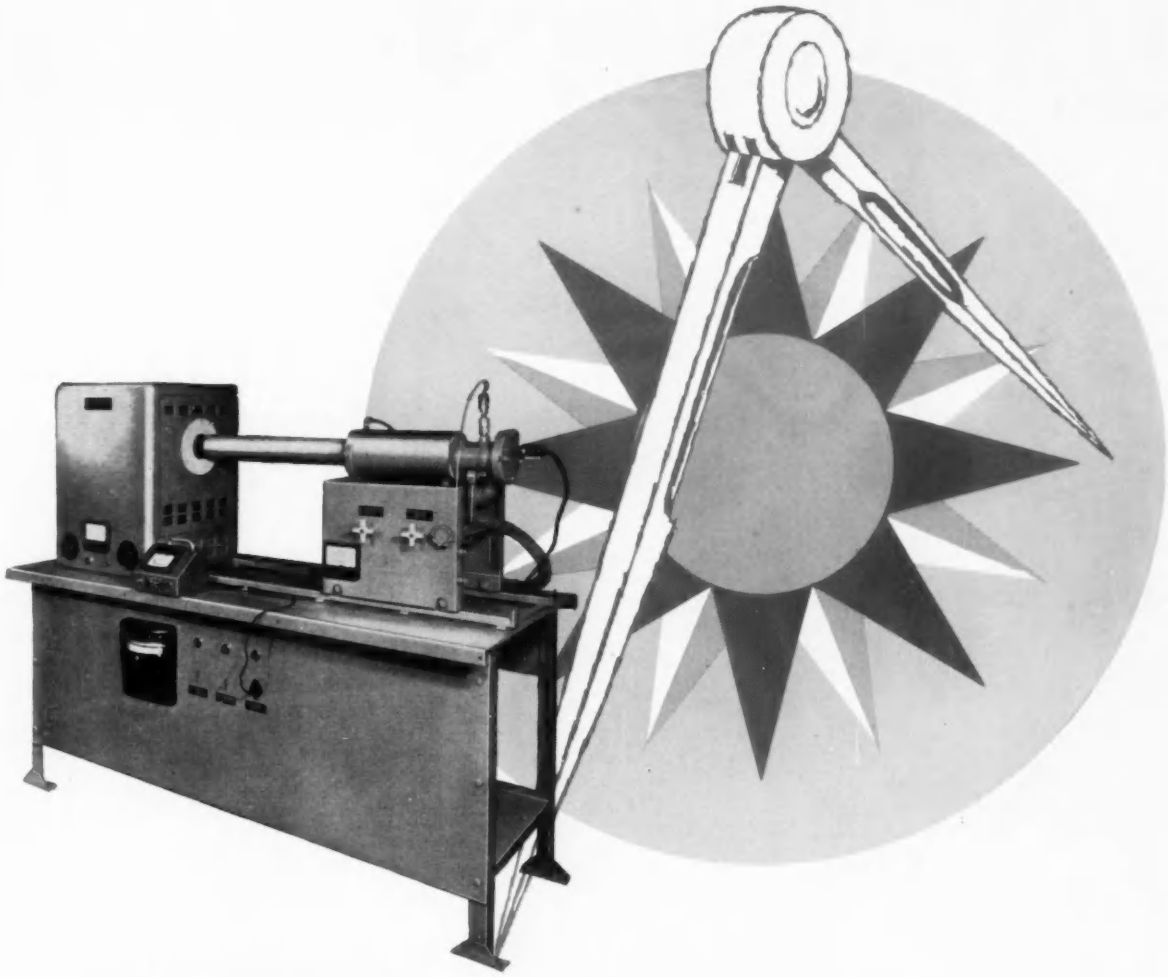
Machine Tools

Predictions made by some of the industry leaders as to the immediate future are optimistic, although understandably inconclusive. We quote, for example, Alfred V. Bodine, president of the National Machine Tool Builders' Association:

"Of particular import today is the contrast between the 1957 estimated totals of shipments and new orders. While shipments have remained high with the industry working off accumulated backlog, net new orders have been progressively declining throughout the year. How soon this trend will be reversed is the major question that will face the industry in 1958. My own opinion is that this is only a question of time. How soon it may take place will depend largely upon the following factors:

"1. Rate of investment in capital equipment reflects confidence in the future. Companies that know full well that modernization is imperative, will postpone it in the face of uncertainty. There have been an accumulation of factors this fall—political, international and economic—contributing to hesitation and postponement. When the uncertainties are resolved—and I am optimistic in my expectation of this probability—deferred buying will be resumed.

"2. Sheer economic necessity will sooner or later force a resumption of machine tool buying in greater volume. Under today's conditions there will inevitably develop severe price competition among companies requiring machine tools for the manufacture of their products. Faced with this emergency, many



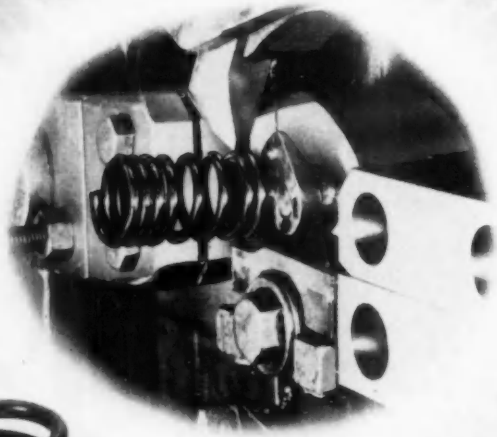
Pilot Plant Equipment... a Lindberg Innovation

When there is something new in "heat for industry" most often it comes from Lindberg. The latest is a new line of Lindberg equipment now available that fills in a long-felt need in metal treating. Our engineers have designed a brand new group of furnaces to bridge the gap between laboratory and production line. This larger-than-lab, smaller-than-standard equipment is designed specifically for pilot plant use. You can test your materials, your methods, on equipment moderately priced but production capable. Fuel-fired, electric and High Frequency units are included. Six different types of furnaces can be supplied including, as illustrated, an electric vacuum-type furnace ideal for testing this newest and most promising heat treating method. Get in touch with your nearest Lindberg Field Representative (See classified phone book) or write Pilot Plant Equipment Division, Lindberg Engineering Company, 2491 W. Hubbard St., Chicago 12, Illinois.

LINDBERG heat for industry

PRECISION?
DEPENDABILITY?
it's Automatic!

QUALITY-CONTROLLED SPRINGS FOR YOUR PRODUCT



Engine Valve Spring as coiled

COILING

at Automatic is another outstanding example of the various precision operations that produce perfect springs for your product. Modern, high speed coilers in a complete range of sizes are arranged for continuous flow production. Every operator is equipped and trained to maintain uniformity and high quality.

During coiling alone, Automatic springs receive these seven quality-control tests.

1. **Tests for proper surface condition**
2. **Tests for diameter**
3. **Tests for free and solid height**
4. **Tests for loads at given heights**
5. **Tests for active and inactive coils**
6. **Tests for pitch or "lead"**
7. **Tests for uniformity.**

FREE!

Valuable booklet on how to specify and order springs. Send for it today

for quality springs "Automatically" think of

AUTOMATIC

SPRING COILING CO.

4048 West Thorndale Ave., Chicago 30, Ill.

a company, in order to survive, will have to replace its old and obsolete machine tools with today's models in order to cut manufacturing costs.

"3. Machine tools are basic to defense, and the Defense Department has now inaugurated a continuing program of replacement of obsolete machines. If an expanded program of missile and rocket production should be inaugurated, it would probably require even more machine tool buying than is presently contemplated. This represents a stabilizing factor as to the industry's outlook for 1958. It is also to be hoped that the Defense Department may consider a change in policies with respect to the purchase of foreign-built machine tools. While price differentials must of course be borne in mind on behalf of the taxpayer, it is also important that the nation's machine tool industry be recognized as a basic segment of our entire program of national defense, and should not be penalized because wages paid machinists in foreign countries are far lower than those paid machinists in the United States.

"Technological advances in the art of removing and shaping metal are accelerating faster than ever before; and the emergencies of tomorrow cannot be met by yesterday's equipment. All underlying considerations point toward an upturn in machine tool sales. I repeat, it is only a question of time as to when this upturn will materialize."

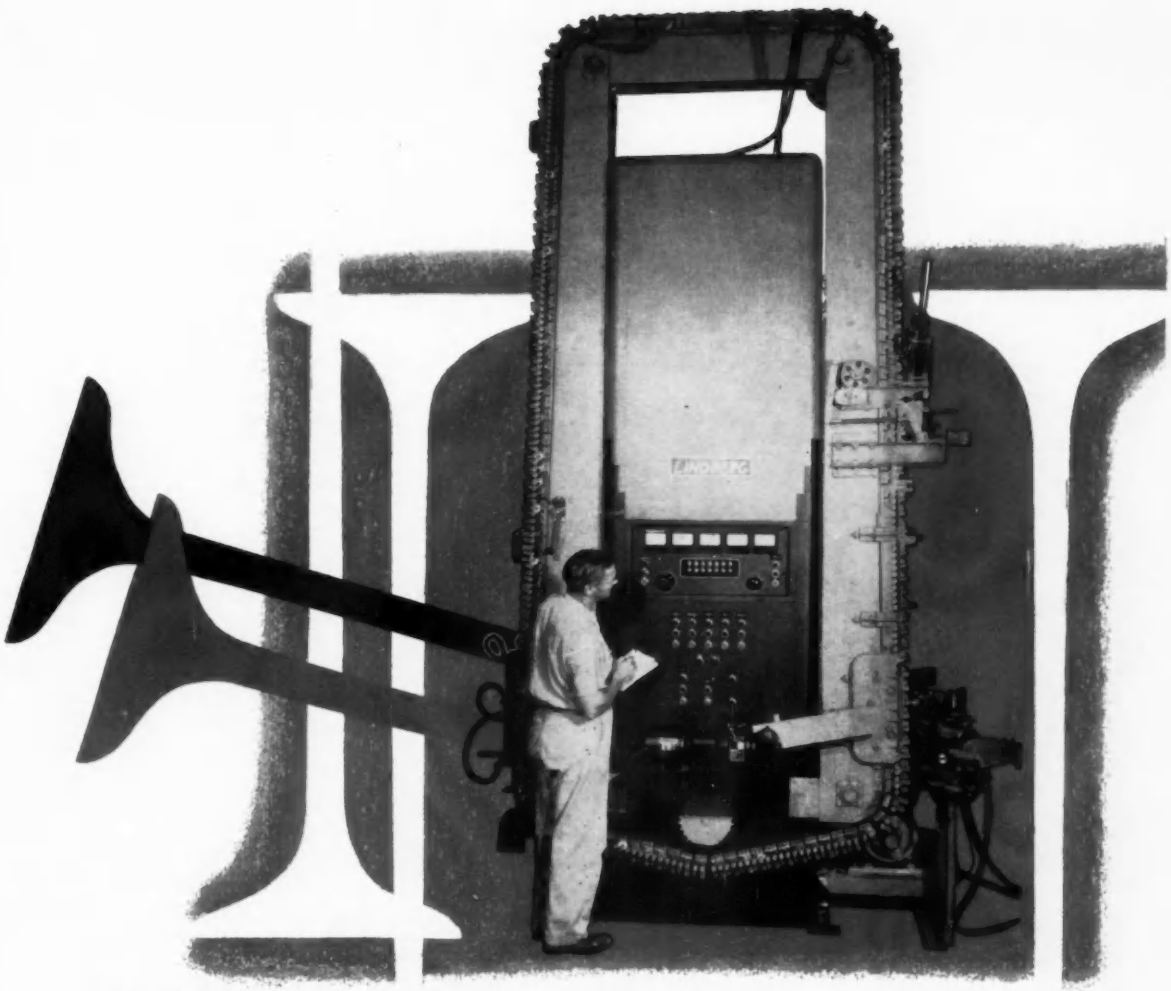
Gears

John C. Sears, executive secretary of the American Gear Manufacturers Association, states:

"We go into 1958 with a 20 per cent lower backlog than we entered 1957. Nineteen fifty-eight, we believe, will be a leveling off period. Current omens make it relatively safe to predict that we will hold our 1957 average. The latter, incidentally, is also the approximate average for the period 1955-1957."

Tools and Dies

According to George S. Eaton, executive vice-president of the National Tool & Die Manufacturers Association, industry leaders see



Lindberg pioneers in High Frequency Heating

Along with its pioneering in all phases of "heat for industry" Lindberg is one of the largest makers of High Frequency heating units. Our "H-F" designers and engineers have made outstanding developments in this important heat treating field. For example, we illustrate a remarkable unit just recently completed for aluminizing automotive valves. It was designed vertically, saving 60% of floor space, and is completely automatic. No operator is required. It fits perfectly into an automated production line.

Our High Frequency Division provides units for hardening, brazing, heating for forging and forming, annealing and many other processes, and designs a variety of fixtures for application to "H-F" units. Lindberg also supplies a complete line of motor generators for all induction heating and melting applications. Get in touch with your nearest Lindberg Field Representative (See classified phone book) or write High Frequency Division, Lindberg Engineering Company, 2491 W. Hubbard St., Chicago 12, Illinois.

LINDBERG heat for industry

better times ahead for the 1st half of 1958. "No sharp upturn is in sight," he said, "but we expect a gradual improvement that on the average, over the country, should result in a 10 to 20 per cent gain over present low levels, and a return to considerable overtime in some areas."

A major factor in this prediction is the anticipated need of the automobile manufacturers to order special tooling for 1959 models. Not much of this work has yet been placed, according to Mr. Eaton, and if earlier plans are carried through the program should be substantial.

Mr. Eaton also reports that tooling orders for guided missiles are beginning to be released in considerable volume, and that there are indications that appliance manufacturers may be in the market for more special tooling than has been the case recently. New models can be the means of stepping up lagging sales.

Contract tool and die manufacturers, in looking at the overall picture, do not feel that business in 1958 is apt to equal the volume generated in the early months of 1957. Since there can be no mass production until the special tooling required has been obtained, the key to how well the tool and die industry will fare early in 1958 lies in how active the metalworking and plastic industries will be later in the year. The general expectation of the Association members is that these industries will intensify their activities, causing some improvement in tool and die orders.

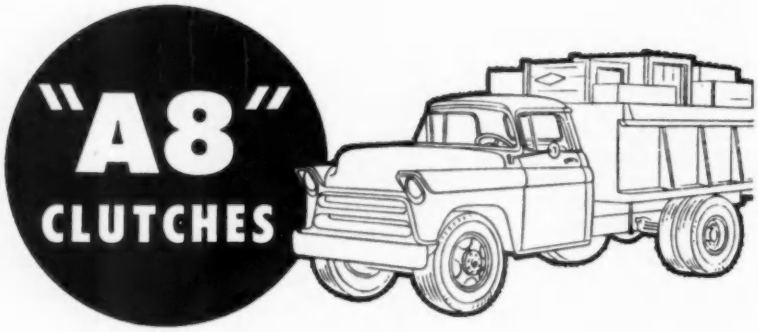
Around the Industry

LeMaire Tool & Manufacturing Co. has changed its name to LeMaire Machine Tool Co. in order to reflect more accurately the company's present activities, according to Wayne Sinclair, president.

Double A Products Co. of Manchester, Mich., has been acquired by Brown & Sharpe Mfg. Co. as a wholly-owned subsidiary. The former company makes hydraulic control valves for machine tools, while B & S through its Hydraulic Products Div., has been making pumps. In combining these two organizations the development of new and expanded hydraulic product lines is envisioned by the management.

Wickes Corp.'s Machine Tool Div. reports that it received orders for machine tools totaling slightly over $500,000 during the first 18 days of December. Most of the machines, according to Carl Bintz, division president, are for delivery to the motor truck industry, while those remaining are special machines for steel industry suppliers. He also said the division had a 6½-month order backlog.

Machinery Associates, Inc., with main offices in Wynnewood, Pa. (suburban Philadelphia), has been appointed a distributor for Danly Machine Specialties, Inc. The new distributor will represent Danly in the eastern half of Pennsylvania, the southern half of New Jersey, the states of Delaware and Maryland, and in the District of Columbia.



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NEW THREE LEVER DESIGN
LIGHTER WEIGHT—SHALLOWER
SMOOTHER, QUIETER OPERATION
AVAILABLE IN 10", 10.5", 11" SIZES
ARCH TYPE CONSTRUCTION FOR BETTER VENTILATION
SELF ADJUSTING—MINIMUM MAINTENANCE
DESIGNED FOR HIGH TORQUE ENGINES—PASSENGER CAR AND LIGHT TRUCK

BORG & BECK®
THE AUTOMOTIVE STANDARD FOR MORE THAN 40 YEARS

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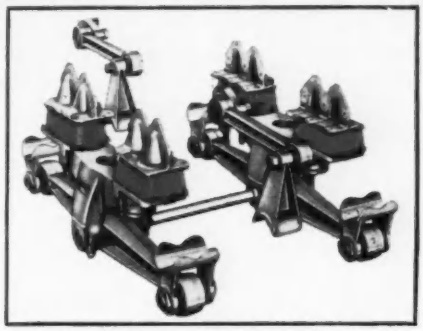

The unique design of the "load cushion" accounts for smooth, even rides in the full range of loads, empty to full. Enjay Butyl Rubber (in red) made it possible.

ENJAY BUTYL "LOAD CUSHION"

replaces steel springs in big Tractor Trailers

The "load cushion" is an important innovation in tandem suspension. Developed by the Hendrickson Mfg. Company, it is made of Enjay Butyl and replaces steel leaf springs. Utilizing the great strength and impact resistance of Enjay Butyl, the "load cushion" gives the ultimate in a soft, easy ride within the complete range of loading, from empty to full. Besides giving a smoother, steadier ride, it increases tire mileage, reduces weight and significantly reduces wear and tear on equipment.

Enjay Butyl has proved to be the answer to problems in many fields of industry. It may well be able to cut costs and improve the performance of *your* product. Low-priced and immediately available, Enjay Butyl may be obtained in non-staining grades for white and light-colored applications. Get all the facts by contacting the Enjay Company. Complete laboratory facilities and technical assistance are at your service.

Be sure to visit the Enjay Butyl Rubber Booth Number 33 at the S. A. E. Annual Meeting in Detroit, Jan. 13-17.

ENJAY BUTYL

Enjay Butyl is the super-durable rubber with *outstanding* resistance to aging • abrasion • tear • chipping • cracking • ozone and corona • chemicals • gases • heat • cold • sunlight • moisture.

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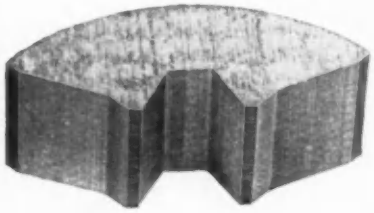
... any *shape* ... any *size* ... any *friction* to meet your most exacting requirements!

ROUND

as for Race Cars

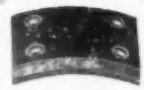


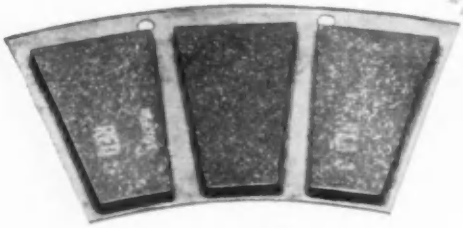
INTRICATE

as for Industrial Brakes

TINY

as for small Precision Assemblies





BIG

as for giant Forming Presses

● World Bestos is currently helping many manufacturers solve difficult braking problems with special friction formulas that assure dependable stopping power, non-fading performance and extra long life.

World Bestos offers extensive research and development facilities and more than 30 years' specialization in friction material manufacture. Modern, high-capacity plant assures on-schedule delivery.

● **Write for new Industrial Brake Folder . . . or let us know your specific requirements. Send prints and specifications if possible. Engineering assistance available.**

WORLD BESTOS NEW CASTLE INDIANA

DIVISION OF **Firestone** TIRE AND RUBBER CO.

Industrial and Automotive Brake Blocks and Linings • Transmission Linings • Special Clutch Facings • Vibration Controls • Sheet Packing

AIRBRIEFS

(*Continued from page* 96)

Secret of the improved grease is the use of an organic vat dye that serves as a thickener to improve heat stability and jelling efficiency.

Record Peak in Air Traffic for 1957

Traffic carried by the world's scheduled airlines reached another record peak in 1957. The International Civil Aviation Organization in Montreal, Canada has released the figures shown in the accompanying table for international and domestic scheduled air service on revenue traffic for the years 1945 to and including 1957.

These figures show the continuing growth and expansion of air transport ever since 1945; if this expansion continues through 1958, we can reasonably expect the airlines next year to carry close to a hundred million passengers, and to have their aircraft spend close to 10 million hours in the air.

Salvaging Kirksite Dies

Salvage of large Kirksite dies (some weighing up to 20,000 lb) used in drop hammer production of airplane parts was a problem to Tempco Aircraft Corp. of Dallas, Texas. Outside salvage concerns quoted eight cents a pound to salvage the material by a method of chipping off the plastic coating and cutting into smaller pieces with acetylene torches. R. H. Mayne of the Tempco Corp. sugested a scrapping furnace made of steel plate and I beams heated with natural gas. The plastic coating is melted off at low temperature and then the heat increased to 600 F to melt the Kirksite which is tapped-off at the bottom into 2000 lb pigs. Cost of salvage this way is one-fourth cent a pound. Mayne received a $625 cash suggestion award and $100 Savings Bond as a bonus.

AUTOMOTIVE INDUSTRIES KEEPS YOU INFORMED

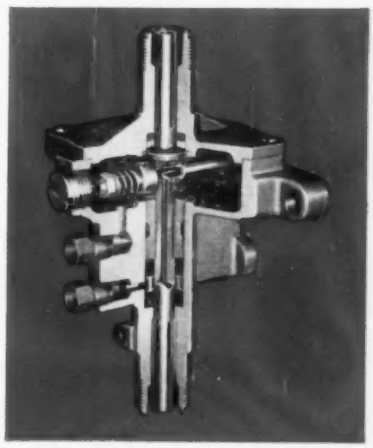
NOW—a truck governor that regulates road speed—not engine speed

For the first time, truck fleet operators can get accurate, predetermined economy results with all trucks by having all trucks operate at road speeds which have proven most economical. The new Holley roadspeed governor is driven relative to rear wheel speed instead of relative to engine speed. It can easily be calibrated for any truck gear ratio and has been successfully tested over thousands of miles of road conditions.

The Holley roadspeed governor can be used in conjunction with the engine speed governor. Thus, if the vehicle is running in one of the lower gears and the engine reaches its governed speed before reaching the predetermined mile per hour setting, the engine speed governor controls. In the event that road speed is reached prior to the engine rpm maximum setting, as in high gear, the roadspeed governor controls.

The roadspeed governor offers fleet operators a complete governing system designed to allow maximum horsepower under extreme load conditions and yet providing pinpoint control of road speed for maximum economy.

For more information on the Holley roadspeed governor, simply send a request on your letterhead.



The new Holley road speed governor, engineered to regulate actual road speed, is designed to eliminate mechanical trouble and prevent malfunctioning.

For more than half-a-century original equipment manufacturers for the automotive industry.

HOLLEY Carburetor Co.

T-8

11955 E. NINE MILE ROAD • WARREN, MICHIGAN

More Government Contract Awards

LATEST contracts awarded by various Government agencies, and covering primarily automotive and aviation products, are listed in the following. Typical of the items contained in these monthly listings are: passenger cars, motor trucks, aircraft, military tanks, engines, transmissions, other components, spare parts, etc. This list is for the period Nov. 29 to Dec. 31, inclusive.

AEROPRODUCTS, Dayton, Ohio
Spare parts for propeller assemblies—$1,015,576 — $412,191 — $283,762 (three awards)

AIRCRAFT ENGINEERING AND MAINTENANCE CO., Oakland, Calif.
Progressive aircraft reconditioning cycle and modification of C-131A type aircraft—$59,844

ALLIS CHALMERS MFG. CO., Milwaukee, Wis.
Forklift trucks—4 ea.—$22,903
Crawler tractors and harrows—1 lot—$43,624

Dual
VISION-AID HEADLAMPS
TUNG-SOL ELECTRIC INC.
NEWARK 4, NEW JERSEY
Sales Offices: Atlanta, Ga.; Columbus, Ohio; Culver City, Calif.; Dallas, Tex.; Denver, Colo.; Detroit, Mich.; Melrose Park, Ill.; Irvington, N. J.; Newark, N. J.; Philadelphia, Pa.; Seattle, Wash. Canada: Montreal, P. Q.

BENDIX AVIATION CORP., Bendix Products Div., South Bend, Ind.
Main wheel assys. for C-97 and B-50 aircraft—$532,110

BOEING AIRPLANE CO., Seattle, Wash.
Modify KC-97-E and KC-97-F Government-owned aerial refueling trainers to a KC-97G configuration, together with one (1) set of animated transparencies—$153,961

CHRYSLER MOTORS CORP., Detroit, Mich.
Automobile—25 ea.—$71,084

CHRYSLER MOTORS CORP., Washington, D. C.
Light trucks—65 ea.—$155,633

CLEVELAND PNEUMATIC TOOL CO., Cleveland, Ohio
Axle component part of strut assembly, applicable to C124 aircraft—$181,548

CURTISS - WRIGHT CORP., Caldwell, N. J.
Modification kits, spare parts, technical data applicable to various propeller assemblies — $1,341,632 and $235,701 (two awards)
Spare parts applicable to propeller assemblies—$249,780

DEMPSTER BROTHERS, INC., Knoxville, Tenn.
Truck, materials handling container hoisting, 5 ton—10 ea.—$29,065

DOUGLAS AIRCRAFT CO., INC., Santa Monica, Calif.
Supplies and services relating to the Honest John Missile—$56,645
Repair parts for Nike system—$52,630

FAIRCHILD ENGINE & AIRPLANE Corp., Bay Shore, Long Island, N. Y.
Shaft—200 ea.; repair kit—1470 ea.—$190,877

FLIGHT ENTERPRISES, INC., TALOA Div., Windsor Locks, Conn.
Progressive aircraft reconditioning cycle and modification of C-118 type aircraft—$109,276

FORD MOTOR CO., Dearborn, Mich.
Automobile, sedan—30 ea.—$67,738

FORD MOTOR CO., Washington, D. C.
Automobiles—528 ea.—$810,640
Trucks—39 ea.—$138,568
Buses—3 ea.—$14,603

GENERAL DYNAMICS CORP., Convair Div., Fort Worth, Tex.
IRAN (inspection and repair as necessary) and modification of F-102 type aircraft—$1,400,000

GENERAL DYNAMICS CORP., San Diego, Calif.
Modification of F-102 type aircraft—$2,531,240

GENERAL MOTORS CORP., Allison Div., Indianapolis, Ind.
J71-A-2 engines complete, J71A-2 engines w/o afterburners for F3H aircraft—$20,576,640

GENERAL MOTORS CORP., Chevrolet Motor Div., Detroit, Mich.
Trucks—86 ea.—$209,670
Buses—13 ea.—$57,574
Automobiles—131 ea.—$208,451

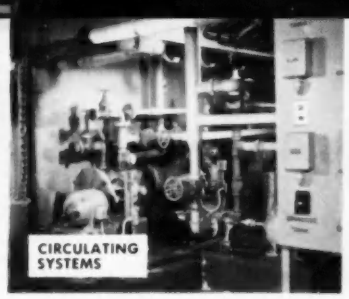
GENERAL MOTORS CORP., Foreign Dist. Div., New York, N. Y.
Automobiles—18 ea.—$26,434

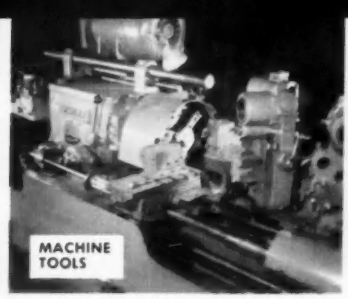
GENERAL MOTORS CORP., Indianapolis, Ind.
Miscel. aircraft ignition equipment—$50,889

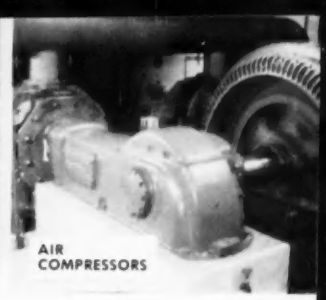
GILFILLAN BROS., INC., Los Angeles, Calif.
Engineering services related to Corporal Missile system—$195,660

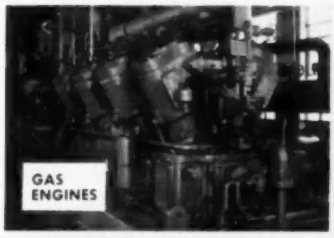
B. F. GOODRICH CO., Akron, Ohio
Assys. & Maintenance parts for various aircraft—various—$179,735

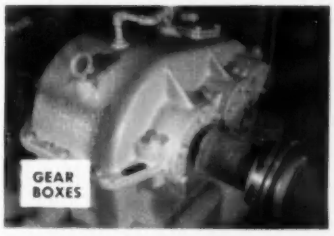
(*Turn to page* 109, *please*)

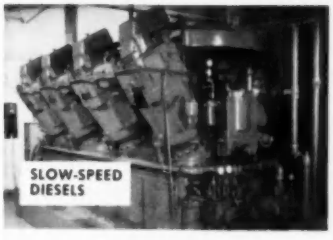












SUN SOLNUS OILS IDEAL LUBRICANTS FOR 80% OF ALL APPLICATIONS

Moderately priced...low in carbon-forming tendencies, Sun Solnus® oils simplify your storage problems by doing with *one oil* many jobs that would otherwise require *several.* Their ability to protect metal parts against corrosion, their resistance to oxidation, and their moderate price all add up to "more lubrication per dollar."

For technical information, see your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-51.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA. © SUN OIL CO.

In Canada: SUN OIL COMPANY LIMITED, Toronto and Montreal

Valve on left is from compressor run for 3,000 hours with well-known, high-grade oil. At right is same valve after a 3,000-hour run with Sun Solnus oil. Note difference in carbon deposits.

3000-HOUR TEST PROVES SUN SOLNUS OILS REDUCE CARBON BUILD-UP IN COMPRESSORS

Equipment: A three-stage Norwalk horizontal-type compressor. Operating pressure: from 1,000 to 1,500 psi.

Test: The compressor was cleaned thoroughly and filled with a well-known, high-grade oil. The equipment was run for 3,000 hours, then torn down for inspection and cleaning. Then Solnus® 300 was tested in the same way.

Results: Look at the two pictures. You can see for yourself how Solnus oil reduced dangerous carbon build-up.

All types of reciprocating air compressors that have been changed over to a Sun Solnus oil show similar results. A test in your compressor will show the same remarkable reduction of carbon deposits.

You can get a technical bulletin about Sun Solnus oils by asking your Sun representative, or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-52.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

More Government Contract Awards

(Continued from page 106)

INTERNATIONAL HARVESTER CO., Washington, D. C.
Light trucks—19 ea.—$54,405

INTERNATIONAL HARVESTER EXPORT CO., Chicago, Ill.
Light trucks—13 ea.—$23,863
Tractors—3 ea.—$14,715

KAMAN AIRCRAFT CORP., Bloomfield, Conn.
H-43A and H-43B helicopters, spares, ground support equipment and technical data—$1,000,000

WALTER KIDDE & CO., INC., Belleville, N. J.
Assys. & maintenance parts for various aircraft—various—$45,664

NORTH AMERICAN AVIATION, INC., Columbus, Ohio
T-28C airplanes—$4,368,000

NORTH AMERICAN AVIATION, INC., Los Angeles, Calif.
Spare parts applicable to F100 D aircraft—$129,448

SILENT HOIST & CRANE CO., INC., Brooklyn, N. Y.
Truck, fork lift—97 ea.; preproduction sample for trucks—1; publication for trucks—1 lot—$886,440

UNITED AIRCRAFT CORP., Sikorsky Aircraft Div., Bridgeport, Conn.
Model HUS-1 helicopters—$10,450,000

WATSON EQUIPMENT CO., Washington, D. C.
Ambulances—4 ea.—$25,300

WILLYS MOTORS INC., Toledo, Ohio
Station wagons & ambulances—10 ea.—$23,656
Light trucks—62 ea.—$134,987
Trucks—230 ea.—$517,518

PLATING FORD BUMPER BARS

(Continued from page 71)

has to be handled in two presses to maintain the same rate as in the other presses which take two pieces in one blank.

It may be noted that before the blanks are fed to the press lines, one side is rough-ground to provide for the desired surface finish, then it is given a phosphate coating which serves as a dry lubricant for the heavy drawing operations.

Another special feature in this new department is the installation of four large polishing and buffing machines, operating on a fully automatic cycle. Each one is housed in an enclosed and ventilated booth to prevent dirt and dust from contaminating the plating baths. Each of the booths is 100 ft long and each one has a merry-go-round conveyor line with a developed length of 300 ft.

Two of the booths handle front bumpers, two handle rear bumpers. Of these, one of each pair handles the polishing of steel prior to plating; the other does the buffing of copper. Each machine is capable of handling 500 pieces an hour with a 12-minute cycle in the machine.

The Udylite plating machines, mentioned earlier, are of straight line type, hence do not have the problem of transferring work around corners as is customary with a merry-go-round layout. One machine handles front bumpers, the other rear. Each plater has 10 basic stages of treatment in tanks as follows: clean steel; copper strike; copper plate; clean; copper strike; white brass; clean; nickel; chromium; and clean.

The material handling system of the platers is so arranged that at the third stage—copper plate—the racks are removed from the plater and transported to the copper buffing booths. Here the stampings are removed from the racks and transferred to the conveyor fixtures. At the end of the buffing cycle, the bumper bars are removed from the conveyor, reracked, and then are transported to the plater to resume the remaining sequence of operations, starting with the cleaning bath.

In view of the necessity for buffing the copper coat, it will be appreciated that the plating equipment operates on an interrupted cycle as noted above.

S-P Sells Former Packard Plant To A Detroit Business Group

Studebaker-Packard Corp. has sold its idle Detroit plant, formerly the Packard home, to a group of Detroit businessmen. The plant had not been used since 1956, when all Packard assembly operations were integrated with Studebaker production at the company's South Bend plant.

TAPPING SCREWS
MACHINE SCREWS & NUTS
DRIVE SCREWS STOVE BOLTS
CARRIAGE BOLTS WOOD SCREWS
DOWEL SCREWS HANGER BOLTS

IN FASTENERS SOUTHERN IS
quality

If quality is an important element in your assembly operations, it will pay you to see how Southern Screw's Quality and Service has worked wonders for many industries. Southern Screws can do the same for you.

There are no better fasteners than USA-made Southern Screws. Over a billion in stock, available from our warehouses in New York, Chicago, Dallas and Los Angeles . . . Let us quote Southern *quality* screw prices on your requirements. Compare with the cost of conventional screws. Address: Southern Screw Company, P. O. Box 1360, Statesville, N.C.

Southern
SCREW COMPANY
LOS ANGELES · CALIFORNIA

(*Continued from page* 52)

METALLURGY

THE year 1957 was one of many important changes in the fields of metallurgy and metals engineering. According to William H. Eisenman, national secretary, American Society for Metals, these developments were prompted by both technical and economic influences.

A curious economic situation evolved. While prices of such metals as iron, steel and aluminum increased substantially, the prices of lead, zinc, copper and titanium dropped. Most metals came into plentiful supply during the year, due to a somewhat reduced level of business activity and cutbacks in military and aviation programs.

However, the most significant events took place on the technical front. Research metallurgists continued to seek means of attaining the ultimate properties of metals. Considerable effort was devoted to finding metals that were stronger, had better corrosion resistance and superior properties at elevated temperatures in the range of 1200 to 2000 F.

During the year, a new concept in metallurgical research was revealed by metals scientists at Westinghouse Electric Corp. Special alloys were compounded to meet specific physical and mechanical property values with the properties sought determined by uses for which the alloys were being developed. The result was the introduction of a new set of alloys for high-temperature gas turbine applications.

Major attention was devoted in 1957 to the development and use of metals which up to now were seldom considered for structural applications. Such metallic elements as vanadium, columbium, and tantalum have long been known and used as alloying elements in other metals. It is only recently that methods have been developed to produce the metals in ductile form so they are capable of being fabricated into usable products.

As the cost of iron ore, melting equipment and steel mill labor continues to rise, there is increased incentive to find a practical method of directly reducing iron ores into pure iron powders, or steel, without an intermediate blast furnace operation. It is estimated that between $9 million and $12 million were spent in 1957 on research projects seeking these goals.

There is also great effort being made to perfect processes which do away with the necessity of casting steel ingots prior to rolling usable shapes of metal in steel production. Several companies are now in oper-

ation with the continuous casting of steel billets, a process which also gives promise of reducing steel costs.

A new man-made element was added to the periodic table during 1957. Called Nobelium, it is element number 102. It is made by bombarding a thin film of curium with carbon 13. The development is the result of joint research carried on in Sweden, England, and the U. S.

Long talked about, and long sought, foamed aluminum is now a practical reality. It is currently used as a stiffening element in aircraft wings, bulkheads, and other structures.

Powder metallurgy has been responsible for another advance in aluminum. Massive pressings of slightly oxidized aluminum powders are further processed into extruded shapes, forgings, sheet, foil, wire and fasteners. Through this development, aluminum products can be used at temperatures at least 100°F higher than is possible with present day wrought aluminum alloys.

Significant forward steps were taken during 1957 in materials utilization through important improvements in metalworking techniques. One outstanding example is in the production of huge aluminum forgings on a 50,000-ton forging press. Where it previously required a rough forging weighing 870 lb to yield a finished part weighing 230 lb, the new forging press produces a rough forging weighing only 289 lb for the same part, a saving in material of 67 per cent.

Year after year more and more automotive manufacturers choose Dole. Today, Dole Thermostats are standard equipment on 38 makes of passenger cars, trucks, tractors, commercial vehicles, industrial and marine engines. This includes 19 out of 20 top passenger cars*.

Dole has earned this position of leadership through their never-ending program of research and development and their constant adherence to the highest standards of quality in engineering and manufacturing. Dole Thermostats have passed every test for accuracy and dependability under all operating conditions.

So . . . it's no wonder that men who know best put their O.K. on Dole Thermostats. It's just good common sense.

*As listed in Automotive News.

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6201 OAKTON STREET, MORTON GROVE, ILLINOIS (Chicago Suburb)

RUBBER

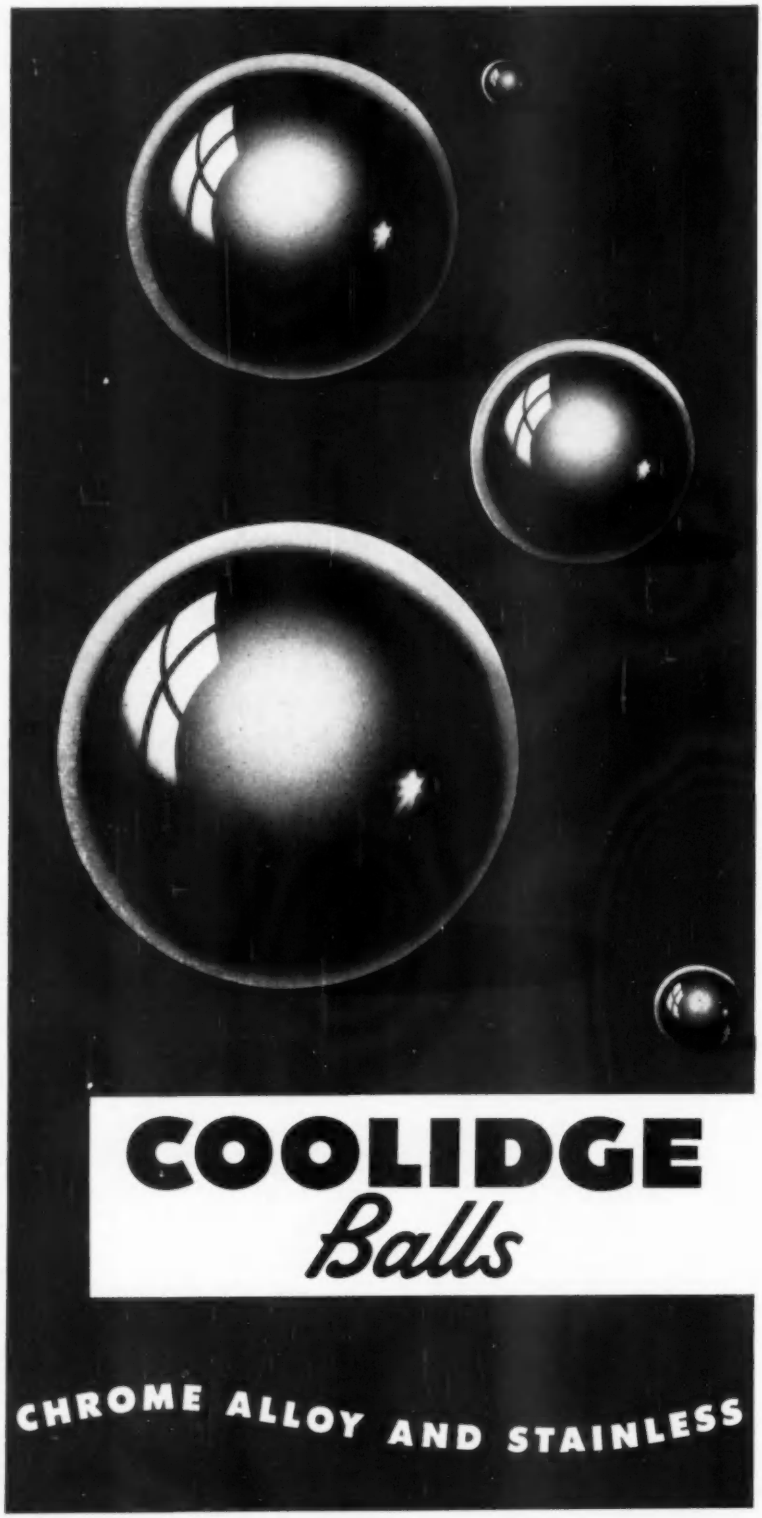
RUBBER manufacturers rang up their biggest sales volume in history during 1957 and see further gains ahead in 1958. While final figures are not yet available, Ross R. Ormsby, president of the Rubber Manufacturers Association, states that in all probability the rubber manufacturing industry surpassed in dollar sales the previous peak of $6.2 billion, which was registered in 1956.

As far as consumption is concerned, Mr. Ormsby estimates that 1957 use of new rubber reached 1,475,000 long tons, compared to 1,436,482 long tons in 1956, for the second best year on record. On the basis of the present rate of increase, U. S. rubber consumption should reach 1,635,000 long tons annually by 1960, an increase of 151 per cent in rubber usage for the 20-year span from 1940.

Synthetic rubbers in 1957 increased their share of the market to more than 63 per cent in relation to total new rubber consumed for the year. The ratio of synthetic to total new rubber use was 58.50 per cent in 1955 and 60.87 per cent in 1956.

Foreign requirements for synthetic rubber will continue to be met chiefly from U. S. production in 1958. In 1957, U. S. exports reached a new record at somewhere between 190,000 and 200,000 long tons, as compared with a previous peak of 149,168 long tons, experienced in 1956.

The natural rubber industry produced approximately 1,930,000 tons of rubber in 1957 for a world that consumed some 1,900,000 tons. About 55,000 tons of natural's total



COOLIDGE CORPORATION
MIDDLETOWN, OHIO

consumption were used in the U. S. —approximately 37 per cent of the total 1,475,000 long tons of rubber used in this country, according to the Natural Rubber Bureau. If prices of natural rubber in 1958 maintain a closer relationship to synthetic than in the past two years, NRB president H. C. Bugbee feels that the percentage of natural rubber used in the U. S. may rise. This would be particularly true, Mr. Bugbee feels, if production of truck tires—the largest single segment user of natural rubber—increased at a higher percentage rate than that of passenger car tires.

Joseph A. Hoban, vice-president of manufacturing for B. F. Goodrich Co., predicts that rubber industry sales of replacement passenger car tires will reach an all-time high of 59,750,000 units in 1958. This would represent a five per cent increase over a record 57,000,000 units in 1957.

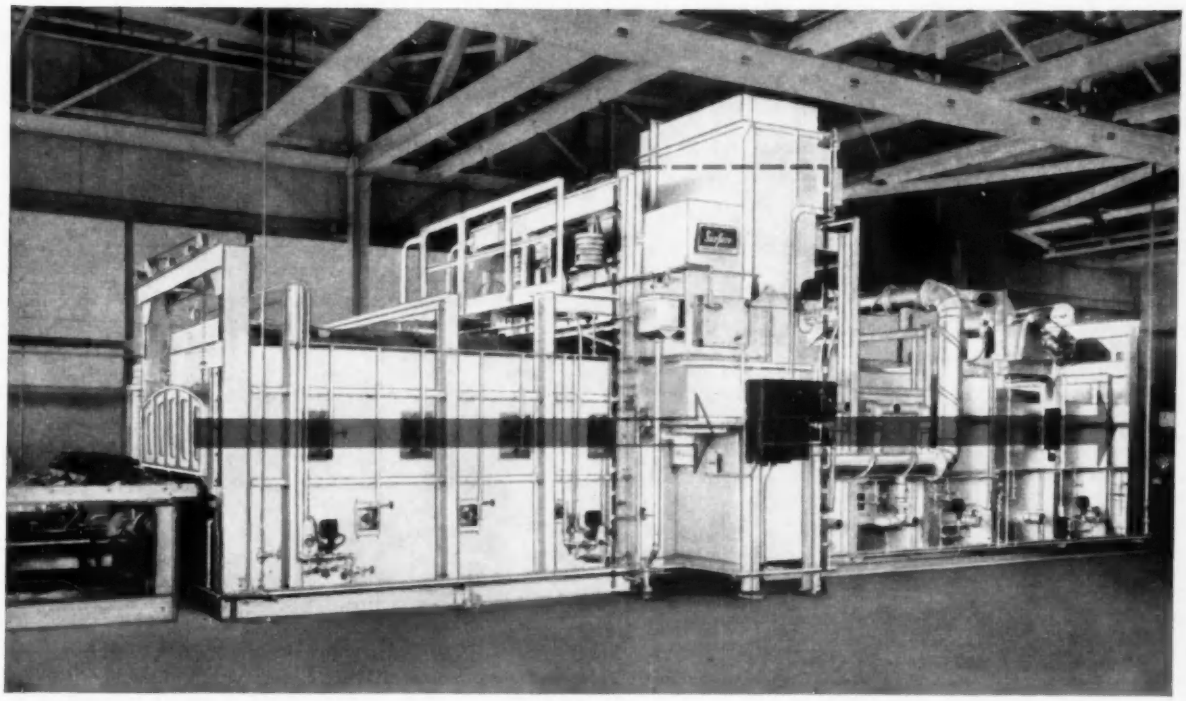
William O'Neil, president of General Tire & Rubber Co., says that increased replacement demand, plus original equipment requirements for cars and trucks, will compel the rubber industry to produce an estimated 114,000,000 tires of all types in 1958. Mr. O'Neil also points out that sales of truck and giant off-the-road tires will be given an important impetus by the multi-billion road-building program.

The some 40,000 non-tire items produced by the rubber industry in 1957 accounted for more than 51 per cent of total sales. Included were such products as belt, hose, molded and extruded goods, foam products, flooring, coated fabrics, etc. The industry's sizable outlays for research and development, which continued at a high level in 1957, have produced in recent years such widely different products as air springs, collapsible containers for transporting bulk freight, safety crash pads, rocket and missile propellants, and components for atomic submarines.

PETROLEUM THE petroleum industry in the closing months of 1957 reduced its levels of operations from those that had prevailed during the earlier months of the year. Accord-

(*Turn to page* 114, *please*)

Superfast cooling for cycle annealing



A furnace-within-a-furnace makes this Surface cycle annealer one of the most versatile heat treat units in the country. It anneals, cycle anneals, and normalizes gear forgings of different size, shape, and alloy at the net rate of 864,000 lbs. per month or better.

Such exceptional versatility is achieved by a superfast cooling zone. Really a full convection furnace within a direct-fired furnace, this zone is isolated by refractory doors. It can be used or by-passed, depending on which of many cycles the customer wants. As a result, the customer can heat treat as many as 13 different alloys in this one furnace.

Adding to the flexibility of the furnace is a modular tray design. Each module is an 18x20-inch chrome alloy casting. Modules can be combined to hold any size of work up to 800 pounds. They are also used to carry work outside the furnace.

This furnace-within-a-furnace is another proof that Surface engineers are old hands at creating new ideas in heat treating.

Write for Bulletin SC-146 on cycle annealing.

Surface Combustion Corporation, 2397 Dorr St., Toledo 1, Ohio. In Canada: Surface Industrial Furnaces, Ltd., Toronto, Ontario.

wherever heat is used in industry

Surface®

INDUSTRY
Reviews and Previews

(*Continued from page* 112)

ing to Frank M. Porter, president of the American Petroleum Institute, factors responsible were the continued high rate of crude supply during the first half and the high level of refined product output during most of the year. The industry is expected to move toward a healthier position in 1958.

Total demand (including exports) for petroleum products, Mr. Porter pointed out, increased less than one and one-half per cent during 1957, in spite of heavy shipments early in the year because of the Suez situation. Domestic demand declined fractionally for the first time in years to 3.191 billion barrels, a decrease of 14 million barrels under the 1956 all-time high. Domestic supply also decreased slightly to an estimated 2.905 billion barrels, down perhaps 65,000 barrels under 1956.

On a daily average basis, domestic supply in 1957 ran around 7.96 million barrels, while total supply, including imports, amounted to 9.490 million barrels. Domestic demand averaged 8.745 million barrels, while total demand averaged 9.318 million barrels daily.

Stocks of crude oil and products at the end of 1957 were estimated to be 843 million barrels. This represents an increase of 63 million barrels, the bulk of which was natural gas liquids and refined products.

Drilling activity declined in 1957, for the first time since 1949. It was estimated that 1957's total of well completions was around 54,050, compared to the 1956 high of 58,259. Of these, more than 20,000 were dry holes, and represented substantial loss of capital investment for producers and other participants in the ventures.

Exploratory well completions also experienced a reversal in 1957 in totaling only 11,950, against 13,034 in 1956. Only 1,650 of the exploratory wells in 1957 were considered successful, the remaining 10,300 wells were dry holes.

Drilling footage, in keeping with the curtailed activity in drilling operations, went down too. Total footage for 1957 was estimated at 223 million ft, versus the 1956 peak of 234 million ft.

Operable refining capacity increased in 1957, but crude runs to stills went down slightly, from 2.905 billion barrels in 1956 to 2.890 billion barrels last year. On a daily basis, runs to stills in 1957 averaged 7,918,200 barrels, compared with 7,937,500 barrels in 1956.

Supplies of motor fuel increased slightly in 1957, as did demand. Production amounted to 1.433 billion barrels, while demand reached 1.388 billion barrels. Octane ratings of motor fuels continued their upward climb in 1957. Between 1950 and 1956 alone, octane ratings of regular gasoline went up 83.5 to 88.8, while those of premium gasoline went from 90.0 to 96.4. Over and above these are the super gaso-

(*Turn to page* 120, *please*)

ROCKFORD
MORLIFE® Spring Loaded CLUTCHES Provide
MORE GRIP WITH LESS SIZE
Small Spring Loaded
Heavy Duty Spring Loaded
Oil or Dry Multiple Disc
Heavy Duty Over Center
Power Take-Offs
Speed Reducers
Because ROCKFORD Morlife Clutches handle double the amount of torque handled by ordinary friction clutches, they enable design engineers to reduce the effect of centrifugal force developed by modern, high-speed engines. By cutting down the required diameter of the clutch, they reduce weight. By insuring better heat disposal, they multiply the clutch's work-life.
SEND FOR THIS HANDY BULLETIN
Gives dimensions, capacity tables and complete specifications. Suggests typical applications.
ROCKFORD Clutch Division BORG-WARNER
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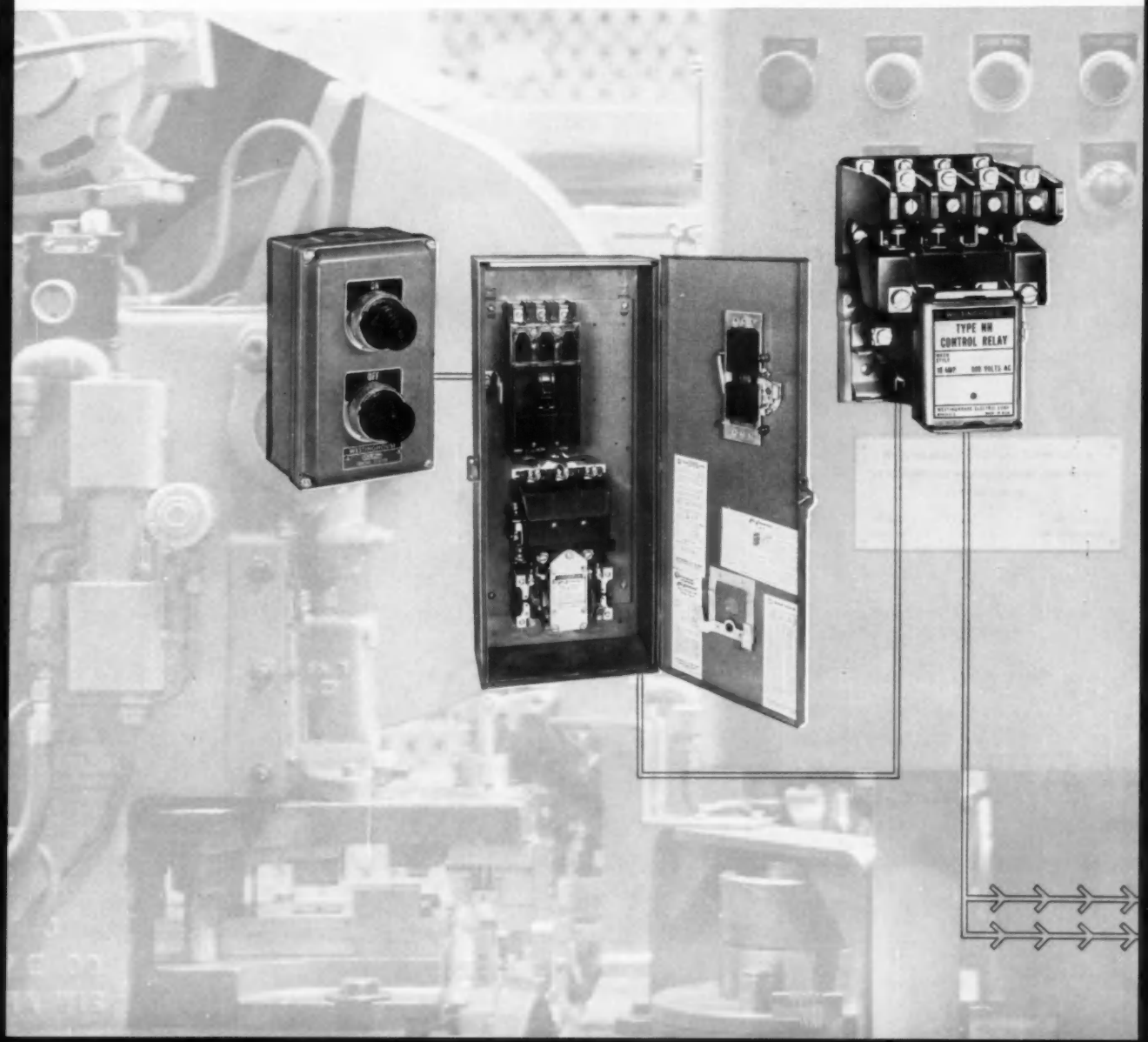
CLUTCHES

WESTINGHOUSE FOR CONTROL

Westinghouse matched control for machine tools



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WESTINGHOUSE
CONTROL STATION
WESTINGHOUSE
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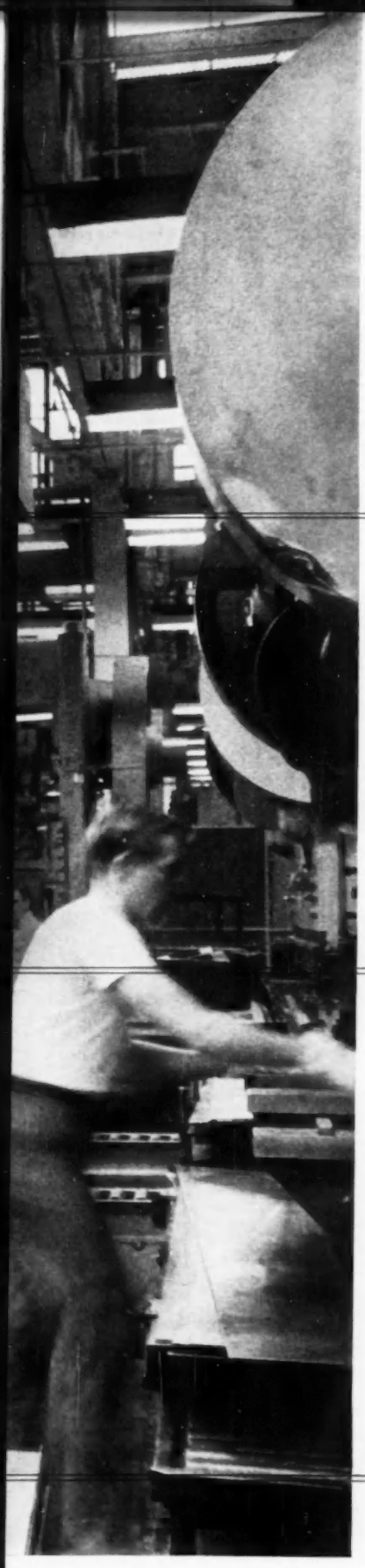
CONTROL RELAY
10 AMP
600 VOLTS AC



Westinghouse Push-to-Test and Pushlites

MAKE CONTROL PANEL SPACE WORK TWICE AS HARD

The Westinghouse Pushlite—a pushbutton plus an indicating light—means you need only half the usual number of units per panel. Frees up to one-half of your control panel for other units, other functions.

Matter of fact, you can make this same panel work *many times* harder with the newest addition to the Westinghouse line—a double-pole, double-throw contact unit that gives you twice the use from a single Pushlite! You can't beat that for space economy—just as you can't beat Westinghouse for Pushlite quality.

For added savings, use Westinghouse Push-to-Test indicating lights. They take the guesswork out of indicating light failures—simply press the light to find out whether bulb (or circuit) is out of order. (As you'd expect, both Pushlite and Push-to-Test are Westinghouse developments.)

Westinghouse Life-Linestarters

RUGGED PERFORMERS FOR RUGGED-DUTY APPLICATIONS

Tested on the toughest jobs—in saw mills, cement factories, chemical plants—these Westinghouse Life-Linestarters* have proven to be industry's most dependable performers. There are good reasons for this superiority, of course. Westinghouse Life-Linestarters feature all front-removable parts for fast, easy maintenance.

And additional auxiliary interlocks which can be added to all starters to handle additional loads.

Then there's the exclusive positive-break, bimetallic disc overload relay—gives you the option of hand reset, automatic reset or no-stop operation. (Available with an auxiliary normally open bell alarm contact.)

And the knife-edge fulcrum that prevents armature sticking or binding.

And the exclusive Westinghouse De-ion® arc quench grids that eliminate contact burning and pitting.

And much, much more—

*Trade-Mark

Westinghouse Relays

ASSURE YOU MILLIONS OF OPERATIONS WITHOUT A SINGLE FAILURE

And here's a relay that will match—operation for operation—any relay on the market today. It's good for millions of operations—*to meet the most demanding* machine tool specifications for reliable, long-life relays.

That's why you just don't go wrong when you specify Westinghouse Relays.

By the way—did you know that the bearing parts of the NH Relay are case-hardened to provide tough, wear-resisting surfaces for longer operating life?

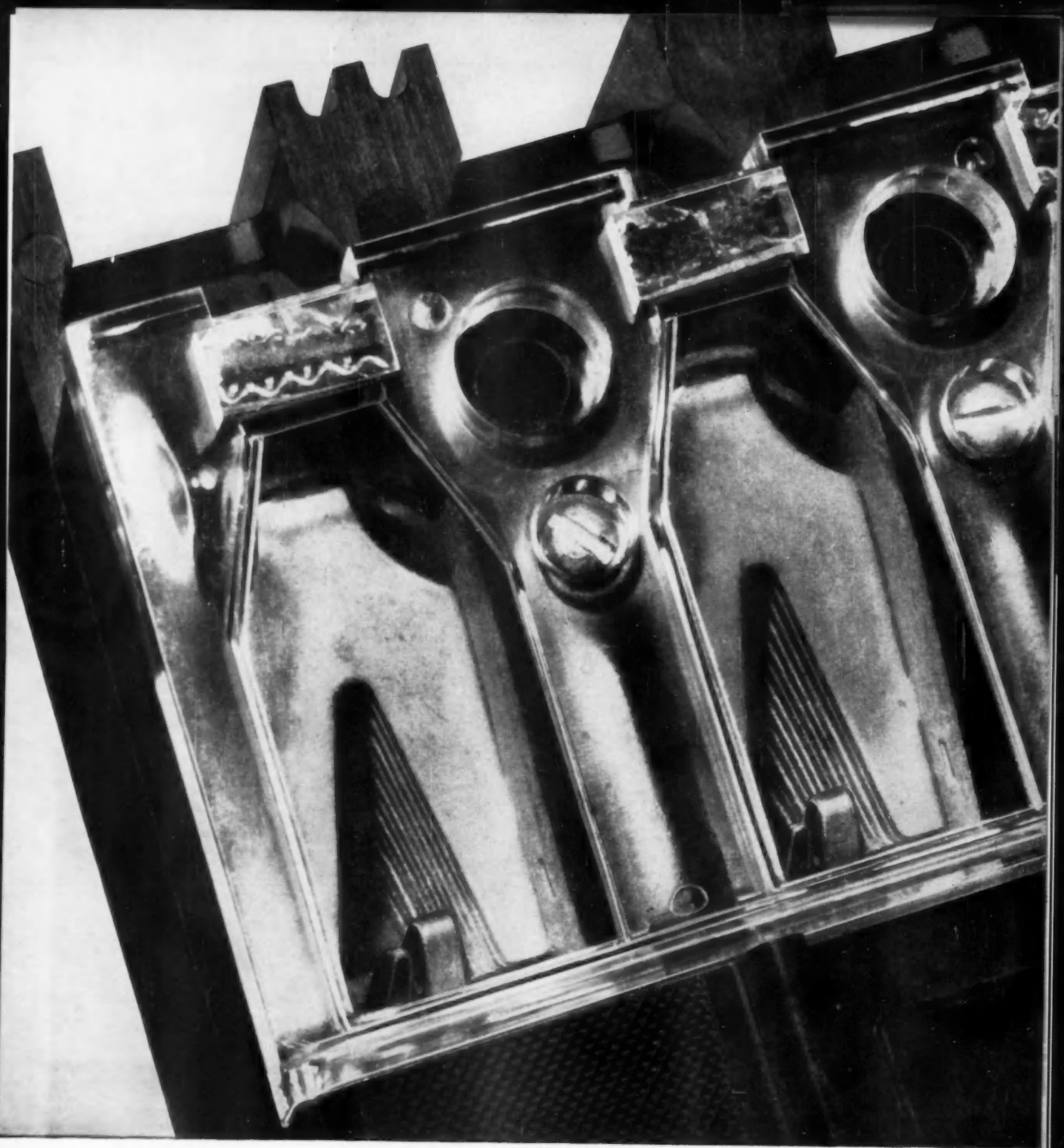
That they're available in any combination of normally open or normally closed contacts from two to six poles?

That for applications where space is critical, the new compact Z Relay—double-pole, double-throw—offers extraordinarily long life?

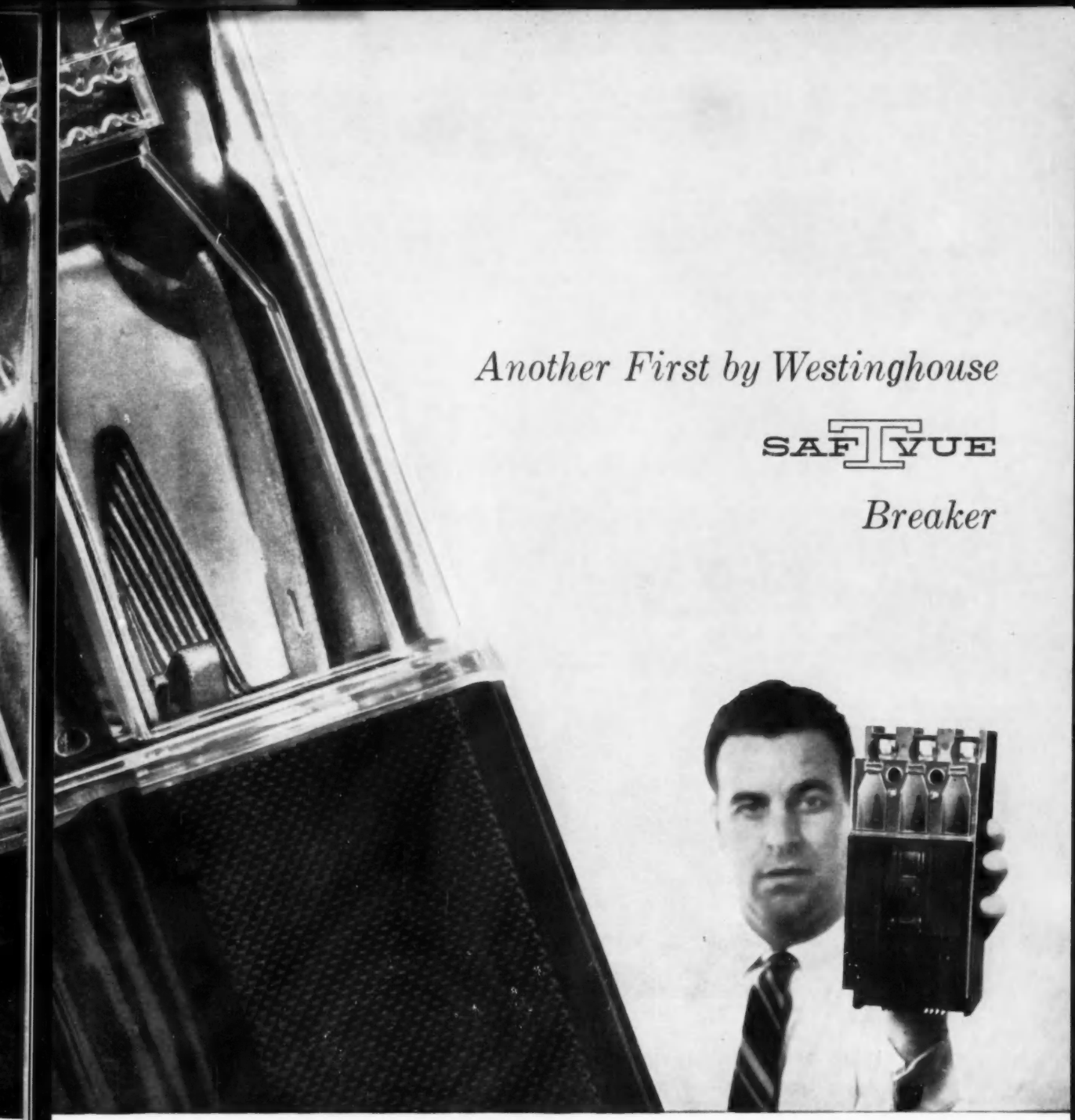
For the whole story on Westinghouse Controls, contact your nearby Westinghouse sales office. Or write for bulletins B-7073, D-B11-000, and B-6749, Standard Control Division, Westinghouse Electric Corporation, Beaver, Pennsylvania.

J-30288

YOU CAN BE SURE...IF IT'S Westinghouse



World's First Breaker with the Contacts VISIBLE



Another First by Westinghouse

SAF-T-VUE

Breaker

Everyone who's seen this exciting new development has said "this is the biggest thing in circuit protection since the development of breakers . . . you're sure the contacts are open (or closed) because you can see through the transparent window."

Of course they're right, and in addition, Westinghouse Saf-T-Vue Breakers have the positive action, tested accuracy, long life and special features that engineers, manufacturers, electricians and contractors have depended upon for years. Now plants whose safety codes require that contacts be visible can use the most modern form of circuit protection.

See your Westinghouse representative, or write Westinghouse Electric Corporation, Standard Control Division, Beaver, Pennsylvania. J-30286

YOU CAN BE SURE... IF IT'S Westinghouse

INDUSTRY
Reviews and Previews

(*Continued from page* 114)

lines, which many oil companies indicate are in excess of 100 octane.

Tax tables showed that, despite quality improvements, the average price paid per gallon by the consumer for gasoline, including tax, increased just a fraction over one cent in 1957, of which about half was due to higher average taxes. The taxes that he paid per gallon, on an average, were equivalent to about 40 per cent of the retail price of the gasoline itself.

Specific figures on capital expenditures in the petroleum industry in 1957 are not available as yet, but the Chase Manhattan Bank predicted earlier in the year that the total for the current 12-month period would be $6.325 billion. There is every indication that the petroleum industry lived up to this forecast to mark an all-time high for capital expenditures in any one year.

It is estimated that the U. S. petroleum industry will have to expend a total of $130 billion between 1957 and 1965, just to keep up with normal requirements.

PLASTICS

A SEVEN per cent gain in the plastics industry occurred in 1957 as the production of plastics and resin materials reached another new high. The total was approximately 4,387,000,000 lb, including cellulosics, The Society of the Plastics Industry, Inc., estimated. It compares with the 1956 actual figure of 4,124,441,302 lb, including cellulosics.

For the second year in a row, the plastics industry was in the $2 billion class as the dollar value of its products reached approximately $2.1 billion, as compared with $2.050 billion in 1956.

A breakdown of last year's production figures for plastics and resins for some of the principal materials is estimated as follows:

Materials	Pounds	Per cent of change
Polyesters	94,800,000	+30.7
Cellulosics	151,000,000	+ 3.5
Polystyrene	635,400,000	+ 1.1
Polyethylene	682,800,000	+22.6
Vinyls	841,200,000	+11.8
Urea and Melamines	308,500,000	— 2.8
Phenolics and other Tar Acid Resins	475,900,000	— 7.1

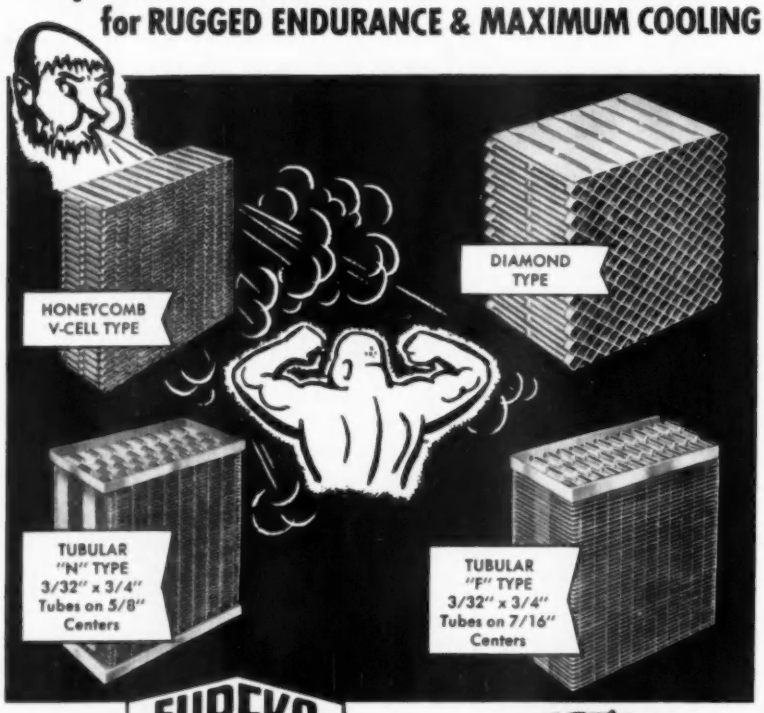
The total dollar sales picture for molders and extruders did not keep pace with the poundage growth for output in this important segment of the industry based on monthly sales statistics compiled by the Society. It is felt that this was due in part to keen competition resulting in lower prices.

The SPI mold sales statistics, generally regarded as an indication of the future trend of new business, continued to run a bit higher than the year before. New mold sales were up 2½ per cent in 1957; however, this contrasted with a 16 per cent increase in 1956 over 1955.

In regard to general business conditions in the plastics field, SPI conducted a survey among its 950

(*Turn to page* 140, *please*)

Depend on EUREKA RADIATORS for RUGGED ENDURANCE & MAXIMUM COOLING



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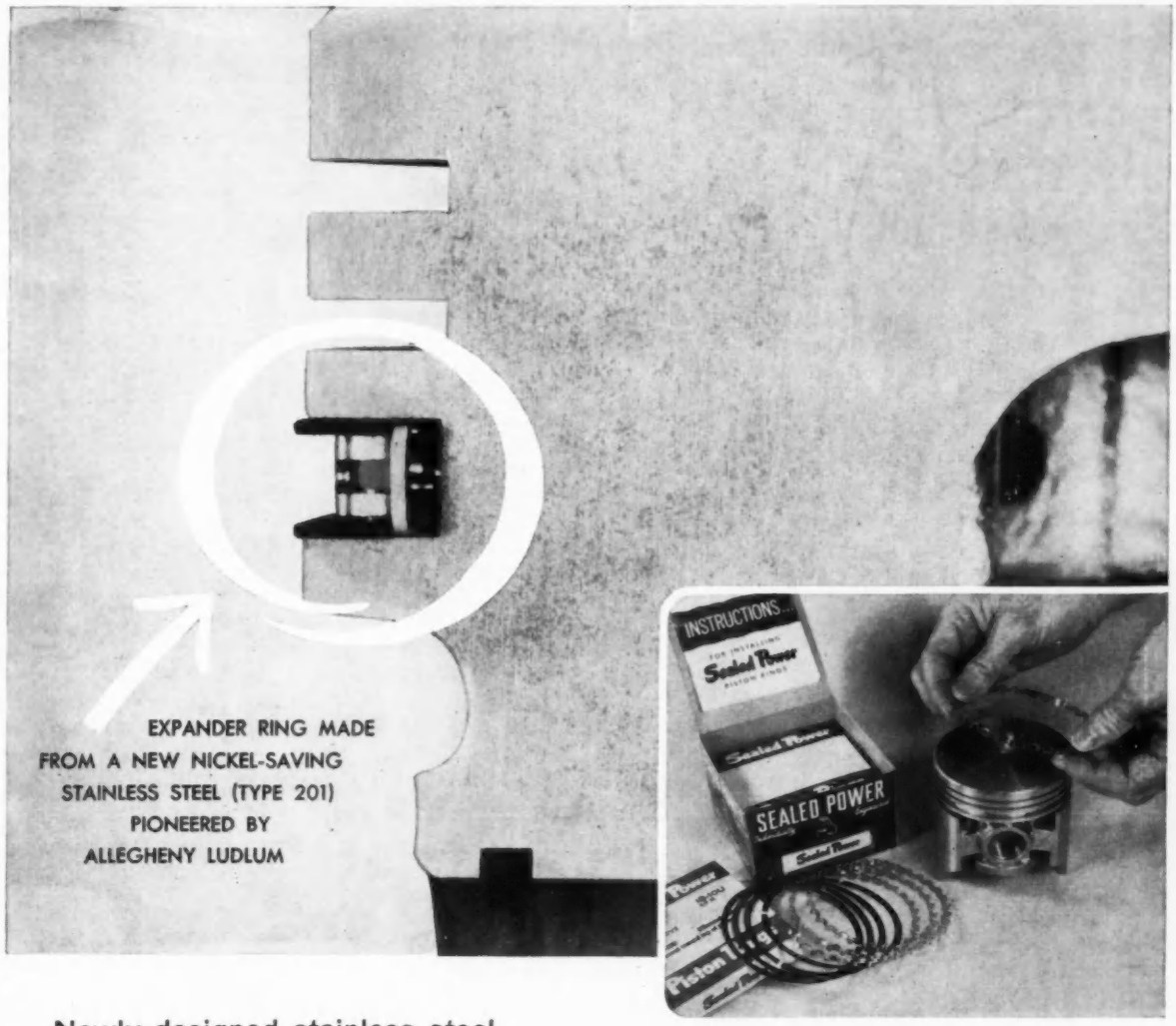

Newly-designed stainless steel

OIL RING ASSEMBLY gives auto drivers 3-WAY ADVANTAGE

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BETTER ENGINE PROTECTION

LONGER ENGINE LIFE

Oil rings do a very demanding job in an automobile engine. They control the amount of lubricant allowed to pass up to the compression rings and cylinder walls. In modern cars, with higher compression ratios, the tension of the oil ring expanders has had to be increased—and that's where Allegheny Type 201 stainless offers advantages.

Engine operating temperatures have virtually no effect on this new stainless alloy. It maintains constant tension whether the engine is hot or cold, permitting most efficient design for maximum flow of lubricant when friction is greatest, and less flow when the engine is warmed up and requires less. Formerly, carbon steel expander rings suffered a tension drop when heated to engine operating temperature. Then under heat they took a permanent set, which caused the loss of "cold tension." Allegheny 201 also has ended the problem of expander breakage due to the corrosive action of engine deposits.

This success story is just one of many being written with the new 200-series of low-nickel Allegheny Stainless Steels. Fabricating methods are virtually the same as with the higher-nickel 300-series, but you'll find some advantage in cost, and much greater availability in times of nickel shortage. • If these new steels seem to fit into your manufacturing or service picture, give us a call. *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

WSW 6548

WRITE for a copy of our "Technical Horizons" bulletin on the Allegheny 200-Series stainless steels.
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AUTOMOTIVE DEVELOPMENTS *in* '57

By Joseph Geschelin

ONE of the major happenings in 1957, as we see it, was the registration of some 200,000 foreign cars in the U. S. There is no immediate threat in this phenomenon considering that it represents only a little over three per cent of domestic production for the year.

Demand for Small Cars

But it does prove that an important segment of the buying public had a desire for small, high economy, low priced cars. Indeed, this fact poses a dilemma for the industry. Why are people buying foreign cars? Is it a matter of price or fuel economy? Or is there some element of snob appeal in a foreign car?

Before a domestic manufacturer can take any action about meeting this competition he will have to have a good estimate of the situation. For the fact remains that all previous attempts have failed pretty badly. If there is snob appeal perhaps the public would not go for a small car launched by any one of the big three.

This happens to be just the right climate for the offerings of American Motors. If its 1958 line goes over in a big way it should prove that the public wants small, high economy, relatively low priced cars. And what is more important—will take it in a USA wrapping. If AMC has a big year it will clinch its place as a good competitor in this industry; and it would demonstrate that the domestic market will support an American-made small car line. Here is something that will bear watching this coming year.

Many styling and engineering features are in an excited state of flux today. Those discussed here are not new from the standpoint of unique conception since they have been talked about for many years. However, we felt that a review of certain major topics might be profitable.

Engine Designs

Consider first the engine. By the look of things it is apparent that the reciprocal engine is here to stay

COPPERHEAD!
See these Copperheads, Harry? We're still not getting anywhere with our cleaning problem. I think I'll try Dick Relick at Pennsalt . . . he helped us straighten out our phosphate coating trouble last month, and he ought to have an answer for this.
Yes, in fact we've batted this all around our department. It's possible you're using too strong a cleaner for this job.
Too strong? Now there's a switch!
Cleaning before porcelain enameling isn't a cut-and-dried proposition. We think you need a mild, wetting-type cleaner built to penetrate this complex soil. We suggest you try a drum of Pennsalt 85.

for a long time to come. But what about size and output? Operating economy is in the air and that means smaller engines with more emphasis upon fuel economy than upon maximum output.

Is the next step a smaller displacement, light weight engine? Is the time ripe for an all aluminum structure? At the moment this is a controversial subject and one on which there is little unanimity of opinion.

Yet engine size and weight have a bearing on some other major engineering features. Consider fuel injection. Now that the initial ballyhoo has died down, strenuous efforts are under way to improve performance and find ways of reducing costs. Only the parts makers know how soon these objectives can be attained. But surely no one would be rash enough to say it can't or won't be done.

There is some feeling that the most effective way to use fuel injection would be in conjunction with a new small displacement engine so as to take full advantage of lean mixtures, increased mechanical octanes, and the ability to increase torque. It is probably too early to say whether fuel injection will displace the curburetor, as standard equipment.

Engine Location

A principle that has been on the fire for the last 25 years is that of locating the engine in the rear. If this were easy to do it would solve many headaches. For one thing it would eliminate the tunnel as well as the huge bump over the transmission, thus leaving the car interior clean and roomy. It would also make possible the use of full thickness seat cushions for the comfort of the riders. There are indeed many advantages.

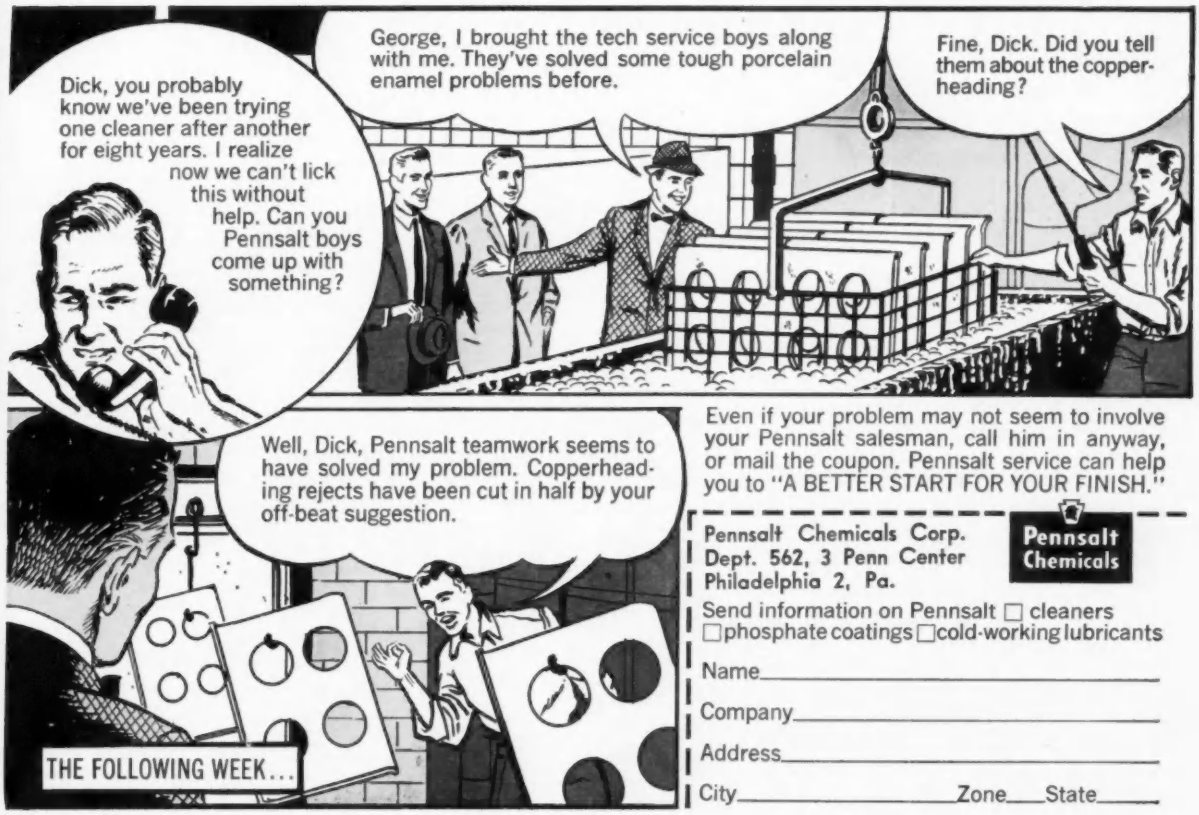
Another plus feature could result from the puncture-proof tires now being exploited. If this development pans out, it means the safe elimination of the spare tire. If the spare can be eliminated, it would be possible to provide ample luggage space at the front end of a rear-engine car.

Whatever advantages there may be, however, appear to be outweighed by immediate drawbacks. One of the most important of these is an unfavorable weight distribution in a large car with a big engine. Certainly this objection can be overcome or at least minimized if we were dealing with a smaller, lighter-weight car, and a smaller lighter-weight engine.

This is not the only objection. Some engineers say that current rear-engined cars are not as well balanced, not as safe to drive or corner. Perhaps compromises could be effected to improve the situation by application to these problems.

Of course, the biggest problem is that a radical change in chassis configuration is terribly expensive from the standpoint of new tooling and could be done only when launching an entirely new line. In any event, the shift to rear-engine drive will require a great deal of planning if and when anyone decides to make the shift.

(*Turn to page* 124, *please*)


Dick, you probably know we've been trying one cleaner after another for eight years. I realize now we can't lick this without help. Can you Pennsalt boys come up with something?
George, I brought the tech service boys along with me. They've solved some tough porcelain enamel problems before.
Fine, Dick. Did you tell them about the copper-heading?
Well, Dick, Pennsalt teamwork seems to have solved my problem. Copperheading rejects have been cut in half by your off-beat suggestion.
THE FOLLOWING WEEK...

Even if your problem may not seem to involve your Pennsalt salesman, call him in anyway, or mail the coupon. Pennsalt service can help you to "A BETTER START FOR YOUR FINISH."

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Send information on Pennsalt ☐ cleaners ☐ phosphate coatings ☐ cold-working lubricants

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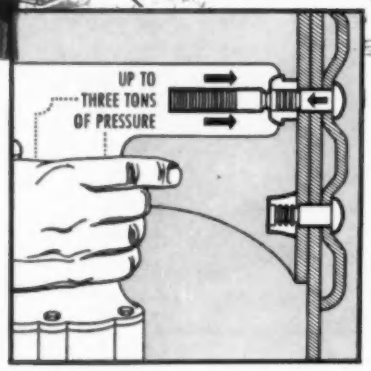

Wayne takes the "Wiggle" out of Bus Bodies with Townsend Lockbolts

The world's foremost manufacturer of bus bodies—Wayne Works Division, Divco-Wayne Corporation—stresses strength, safety, and durability in construction.

Elimination of "rivet-wiggle" is one big reason why Wayne bus bodies are stronger. "Rivet-wiggle" and structural weakness occur when rivets fail to draw sheets completely together. Townsend lockbolts* have two qualities that enable Wayne to produce "wiggle-free" bus bodies.

First, these lockbolts produce absolutely uniform draw-down, or clinch, at each fastening because they are applied with an automatic gun that eliminates the element of human production-line error. Second, Townsend lockbolts, designed to lock with up to three tons of evenly distributed pressure, are far stronger than ordinary bolts, rivets, or spot welds.

In addition to uniform high clinch and vibration resistance, Townsend lockbolts offer ease and economy of installation. These are some of the reasons why Wayne has standardized on Townsend lockbolts for all structural fastening.

If you want these advantages in a fastener, a Townsend representative will be glad to demonstrate lockbolts right at your desk. For full information or a demonstration, write to Townsend Company, P. O. Box 237-CC, New Brighton, Pa.

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*Licensed under Huck patents RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049 and 2,754,703

AUTOMOTIVE DEVELOPMENTS

(*Continued from page* 123)

Air Suspension

What about air ride? This feature was given full play in launching 1958 cars. The industry is watching the figures to see just what percentage of cars actually have been equipped. The important thing is the degree of public acceptance at the extra cost. To be sure air springs, like any other new mechanism, are bound to show bugs but these can be worked out cooperatively. It is certain, however, that if the public goes for air ride every make in the industry will have to offer it.

Unitized Bodies

Unitized body structure has come in for considerable attention, particularly with the adoption of this principle by Lincoln and Thunderbird. As a matter of fact this is an exception that proves a rule. It is a fact that mass producers simply cannot afford to shift to unitized bodies because of the mess it would make of assembly facilities all over the country. Apart from the initial cost—which would be terrific—there would be a major problem involved in stopping production long enough to make the changeover.

Why could Lincoln do it? They took advantage of something that happens only once in a life time. Management made the decision to develop an entirely new car and at the same time authorized a program to build an entirely new plant. This simultaneous event laid the groundwork for a special plant and a special product. Moreover, neither Lincoln nor Thunderbird requires outside assembly facilities. In both cases, the plant at Wixom can produce whatever the market demands.

Brake Problems

Easily the biggest detail problem facing vehicle manufacturers is the brake system. There have been no radical changes in brakes

(*Turn to page* 129, *please*)

in tomorrow's stepped-up competition for sales—

is anything less than

Stainless

good enough for your car?

- ever bright, ever beautiful
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(Advertisement)

Chemical Prepaint Treatments for Metal Surfaces

What they do, the types available, how they are applied

By J. H. GEYER
Manager, Product Development Dept., AMERICAN CHEMICAL PAINT COMPANY

Paint systems have been steadily improved in an effort to produce more decorative, easier-to-apply, and more corrosion-resistant films. The ability, however, of any paint film to perform its predetermined functions cannot be fully utilized without properly preparing the metal surface.

The prepaint preparation of the metal surface is therefore a highly important part of the system. Chemical prepaint treatments are designed to do four jobs and do them well. First, they remove organic soils, shop dirt, scale, and rust or corrosion products from the metal surface. Second, they provide surfaces that are completely compatible with subsequent paint films. Third, they produce a *tooth* that promotes good paint film adhesion. Fourth, they effectively prevent underpaint corrosion growth after any breakthrough in the paint film.

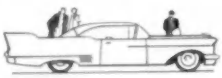
Basically, there are four types of chemical prepaint treatments. These are phosphoric acid, iron phosphate, zinc phosphate, and amorphous phosphate or chromate. Each is discussed briefly in the following paragraphs.

Phosphoric Acid

Perhaps the most widely used and certainly one of the most economical chemical prepaint treatments is the phosphoric acid cleaner combination materials. ACP Deoxidine® is such a material. It removes organic soils, rust, scale and contaminating elements from the metal surface. It also produces a light etch on steel, aluminum or zinc surfaces which considerably aids in increasing paint adhesion. It does not, however, form an actual coating on the metal surface. Any breakthrough in the subsequent paint film will permit underfilm corrosion to proceed. Grades of Deoxidine are available for application by brush or swab, hot and cold dip, or hot spray.

Iron Phosphate

Iron phosphating processes are extensively used in the chemical prepaint treatment of appliances such as water heater shells, ranges, washers, dryers and other *white lines*. These processes will produce excellent paint-bonding films on the metal and retard or prevent underpaint corrosion. Duridine,® ACP's iron phosphating process, is a combination organic soil cleaner and iron phosphate coating material. Both the cleaning and coating operations take place in the same bath. Duridine and other iron phosphates do not lend themselves to brush-on application, are primarily designed for spray type equipment of four or five stages. But several dip installations are successfully operating today by inclusion of an alkali precleaning stage.



Zinc Phosphate

ACP Granodine® is an example of this type of chemical prepaint treatment process, the type now being used to treat steel in the automotive industry, and predominantly specified for steel ordnance and military items. This process forms a coating which offers the ultimate in paint adhesion promotion and vastly augments the corrosion resistance of subsequent paint films. Zinc phosphate materials are extremely flexible as to method of application—can be applied by brush, dip or automatic spray equipment. In a typical dip or power spray system, the stages would be alkali clean, water rinse, zinc phosphate treatment, water rinse, and acidulated final rinse. If the metal has considerable areas of rust or scale, an acid pickle is advisable following the alkali cleaning stage.

On zinc surfaces, the zinc phosphates perform a rather unique function. They act as a barrier against chemical reaction between the applied paint film and the zinc surface. This effectively prevents blistering of the paint and early breakdown of the film. This is in addition, of course, to the improvement of paint adhesion and the retarding of underpaint corrosion. ACP Lithoform® is specially designed for use over zinc surfaces and finds wide application as a prepaint treatment for ornamental zinc die castings, refrigerator liners, and on most galvanized work requiring painted finishes.

Amorphous Phosphate and Chromate

These coatings are the films produced by the ACP Alodine processes and similar ones on aluminum surfaces. They have met with wide acceptance in the prepaint treatment of venetian blind strips, refrigerator liners, aluminum heat transfer units, aircraft sheet metal assemblies, and many other items fabricated from aluminum. The various coatings provide an excellent film for the promotion of paint adhesion and effectively prevent underfilm corrosion. As in the case of zinc, aluminum exhibits a tendency to chemically react with some paint systems. The Alodine processes develop a barrier film between the paint and the aluminum surfaces which prevents this reaction. The Alodines are extremely versatile materials that can be applied to aluminum surfaces by brush, hand spray, dipping, mechanical spraying, or roller coating equipment. Brush application is particularly well adapted to the processing of parts too large for simple dip systems or in manufacturing operations that do not warrant a tank setup. In dip, spray or roller coating application, the system usually consists of an alkaline preclean, a water rinse, the Alodine treatment, a water rinse, and an acidulated final rinse. Where the surface is heavily oxidized, a deoxidizer in the line is needed.

The major chemical prepaint treatments for metals have been covered briefly in this article. More complete information can be had by contacting an ACP sales representative or by writing us at Ambler, Pa.

CHEMICALS ACP PROCESSES

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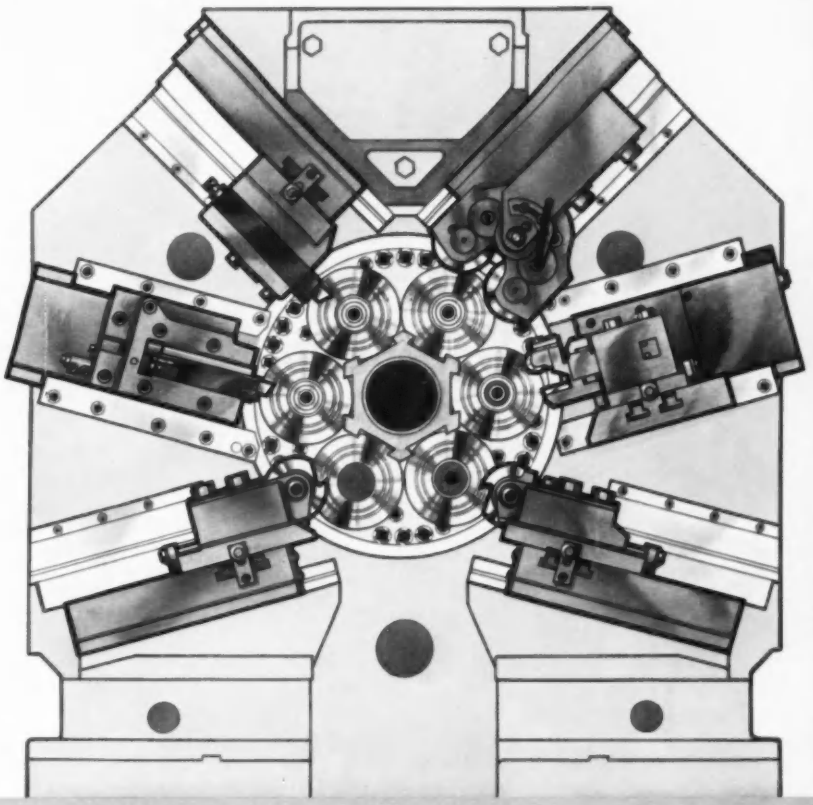
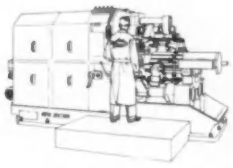
Independent radial cross slides in *all* positions, providing maximum clearance for more cross slide operations.

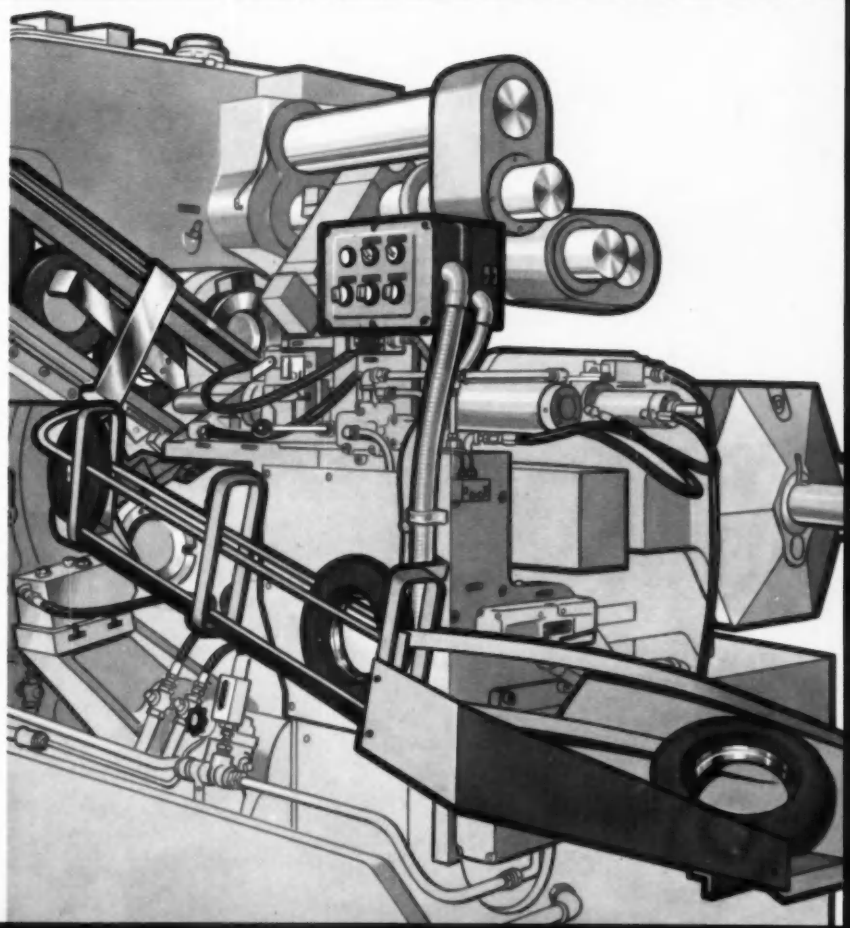


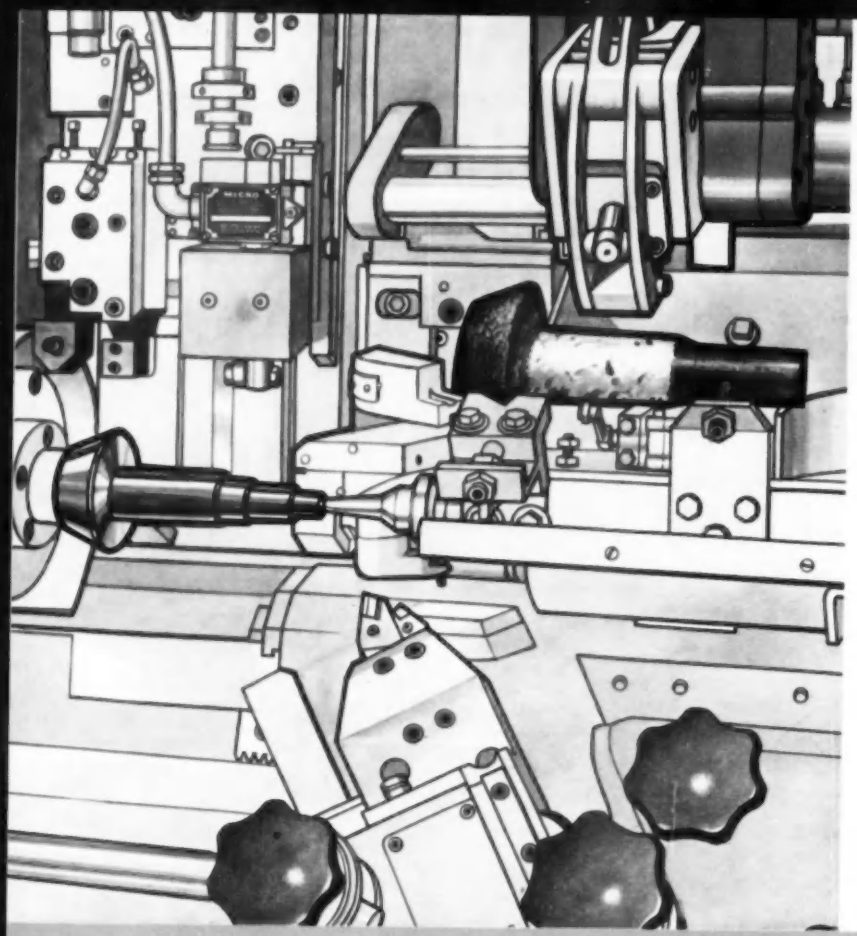
Look at New Britain's

open-end chucker design



Greater accessibility for all applications and particularly well adapted to automatic handling of pieces. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.





Look at
Automatic Loading on
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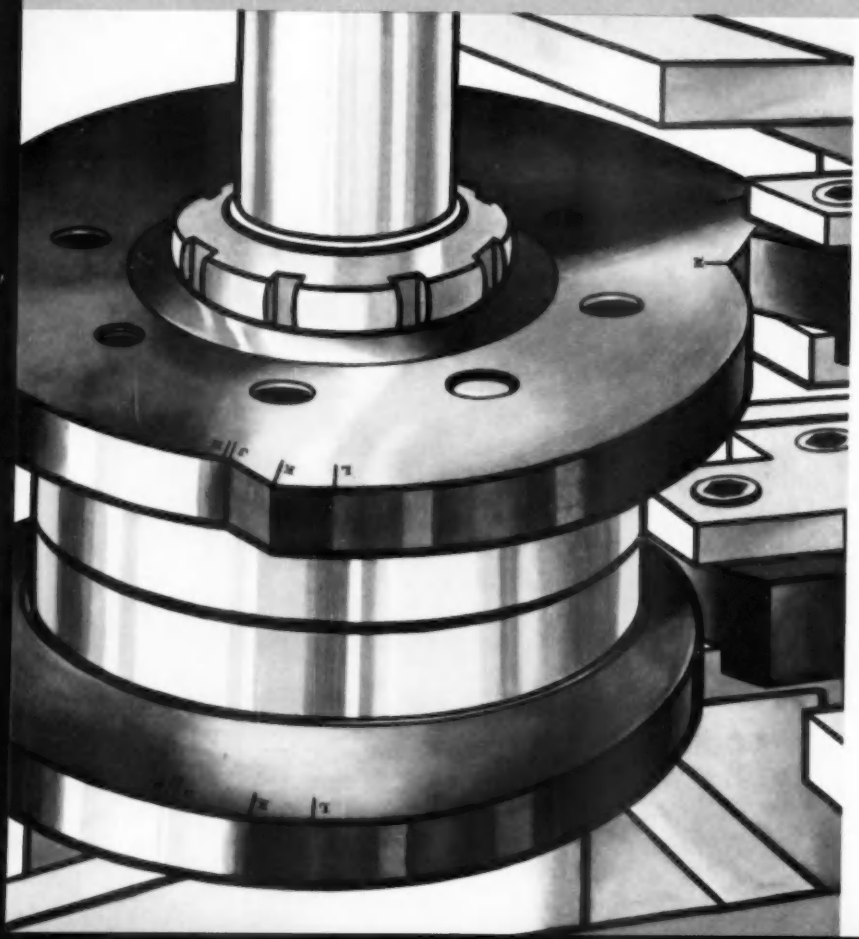
This basic optional feature can make money for you whether you are working with forgings, bar slugs, or bar stock.



Look at New Britain's
cam-controlled boring machine

When you are working to tenths there is no substitute for the positive tool control that only precision cams provide. New Britain-Gridley Machine Division, The New Britain Machine Company, New Britain, Connecticut.

AUTOMOTIVE DEVELOPMENTS

(*Continued from page* 124)

for a long time. The general swing to 14-in. wheels created a real crisis from the standpoint of brakes. In fact, Buick and Cadillac stayed with 15-in. wheels and Buick found it desirable to employ aluminum brake drums at the front in the interest of better cooling. How the manufacturers can possibly make another change, this time to 13-in. wheels, is really a moot question.

Nevertheless, the brake problem persists. Price undoubtedly is a large factor. There are probably other designs available but they are more expensive and will be adopted only when there is no other way out. In the interest of safety some way must be found out of this dilemma. Weight reduction could be a major factor.

Exhaust Systems

Another item that is affected by cost considerations is the exhaust system. Conventional tailpipes and mufflers simply do not have the heat- and corrosion-resistance to cope with present day driving conditions. From the standpoint of the owner this has become a very serious problem with the general use of dual exhaust system. Replacement cost at retail now is of the order of $75 and that's a big bite.

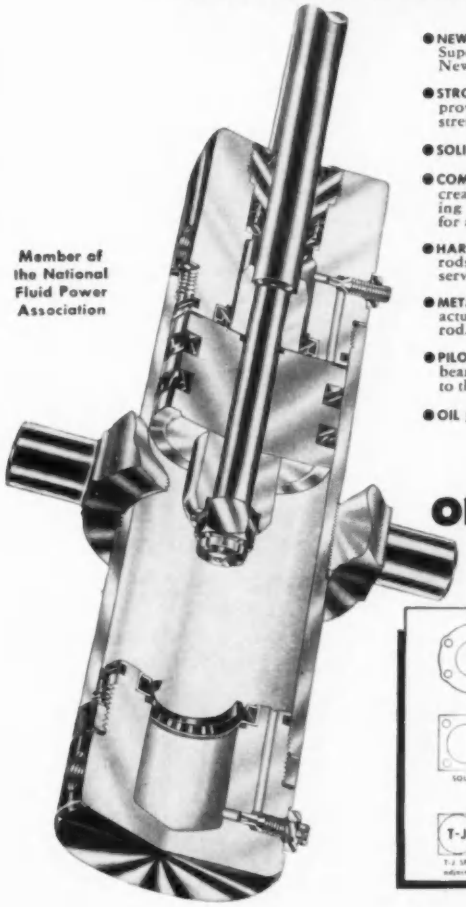
Small Cars

Returning to the matter of small cars, there is a curious kind of psychology among the exponents of foreign cars. For example, one can buy a Ford or Plymouth or Chevrolet stripped down and without special accessories close to the price of some foreign cars. But the people who look at American cars demand power steering and automatic transmissions and power brakes. Yet they will buy the foreign cars without any of these features without question and apparently do not take this into consideration when they compare prices.

Ford and General Motors are in an excellent position to compete

all the EXTRAS are standard with

T-J Spacemaker CYLINDERS



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- STRONGER than outmoded tie rod design, proven through actual tests. No tie rods to stretch.
- SOLID STEEL HEADS throughout the full line.
- COMPACT DESIGN eliminates tie rods, increasing the strength and reducing mounting space required, providing extra room for adjacent equipment.
- HARD CHROME PLATED body bores and piston rods . . . assure you of long trouble-free service. (Standard at no extra cost.)
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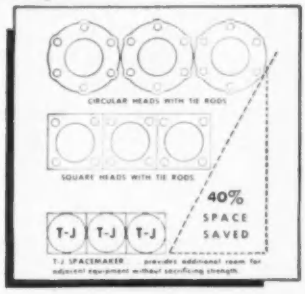
- PILOTED PACKING GLAND with extra long bearing. Additional strength and support to the piston rod.
- OIL pressure to 750 p.s.i. AIR to 200 p.s.i.

DELIVERY OFF THE SHELF!



You *save 40% space* when you switch from outmoded tie rod cylinders to the T-J Spacemaker! It's stronger, too! Fits right into automation programs in countless plants. Delivers top performance and dependability with a big *plus* in advanced features. Wide range of styles, capacities . . . reduces man-hours and costs in all kinds of push-pull-lift jobs. Off-shelf delivery in 64,000 combinations!

NEW LITERATURE—Send today for new Catalog SM56 with complete engineering details on Spacemaker line. Write The Tomkins-Johnson Co., Jackson, Mich.

T-J TOMKINS-JOHNSON
RIVETORS . . . AIR AND HYDRAULIC CYLINDERS . . . CUTTERS . . . CLINCHORS

with the foreign cars since they have family sources in Europe that produce them. If these cars offer good market possibilities the foreign facilities could be stretched sufficiently to take care of almost any demand. It is only if the market shows possibilities of big numbers that these producers would have to consider setting up new facilities either in Europe or in the USA.

For the moment it is time for watchful waiting. With the kind of costs we have in motor car manufacturing today no one can afford to invest in the engineering and plant for the manufacture of an American small car unless there is sufficient volume to support the project. And when we say sufficient volume, we mean really large numbers since no one producer can expect to get all of the business.

"PONY POWER" MOTORS

that give stamina to your products

Lamb Electric **fractional** horsepower motors, like the small horses of the famed western-pioneer-day Pony Express, are developed for *stamina.*

Their dependability, and efficiency (optimum weight-size-horsepower ratio) are qualities that result from proper design and careful manufacture by personnel with many years of experience in the small motor field.

May we demonstrate how Lamb Electric Motors can bring these advantages—and also perhaps lower costs—to *your* products?

THE LAMB ELECTRIC COMPANY • KENT, OHIO
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Lamb Electric
SPECIAL APPLICATION FRACTIONAL HORSEPOWER MOTORS

Radar voltage regulator gear motor.

A rugged high-torque, high-speed motor.

Motor with efficient spur gear speed reducer.

BUSINESS PULSE

(*Continued from page 94*)

latedness of the components, in ignoring the fact that changes in one component tend to have important secondary effects on others. In the present situation, it is obvious that any substantial cutback in the consumer sector could upset the seemingly reasonable estimates that are now being made for such things as capital spending and inventories.

Capital Investment

Similarly, there is common agreement that the direction of capital spending will be downward in 1958, at least through much of the year. This is indicated by both private and Government surveys of investment intentions and also by the National Industrial Conference Board's statistics on the rate of new capital appropriations. Such a pause would certainly be a logical development in view of the huge boom of recent years, which has produced considerable excess capacity in numerous sectors of the economy. Moreover, it makes sense against a background of "profits squeeze," such as exists today.

As far as inventory prospects are concerned, the outlook is favored by the fact that businessmen in general pursued cautious policies in 1957. There was some net accumulation, but it is generally agreed that this was of a minor nature and that consequently no significant unbalance between business stocks, on the one hand, and business output and sales, on the other, exists at present. This means that businessmen in general probably feel no strong compulsion to liquidate stocks on a large scale, as they did, for example, in late 1953. Some liquidation probably must be expected in the first half as an adjustment to the business downtrend now in progress, but if the decline in general activity does not accelerate, cutbacks will presumably be moderate, that is, within the range of $1 billion to $2 billion.

(*Turn to page* 132, *please*)

(Advertisement)

R B&W FASTENER BRIEFS

RUSSELL, BURDSALL & WARD BOLT AND NUT COMPANY

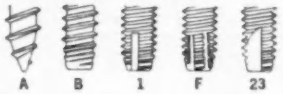
Technical-ities

By John S. Davey

How to select tapping screws

1. Use *thread forming* screw Type A, B or C when material is ductile enough to stand deforming action of screw. If not, use *thread cutting* type.

2. Type A is used with pierced hole for starting; and where an exposed point doesn't matter. All other cases use B, C, or other blunt screws in drilled holes.



3. When load is no factor, metal gauge determines diameter of screw. Pick a thread pitch which gives at least a full thread engagement.

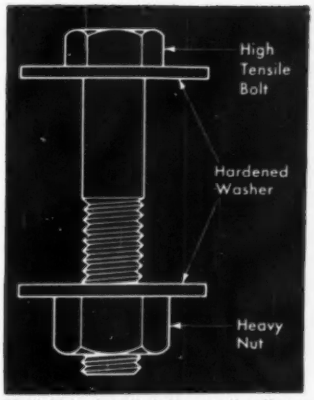
FOR EXAMPLE: Metal .062" thick suggests use of #7 Type A or #10 Type B (both have 16 threads/inch).

$$\text{PITCH} = \frac{1.00}{16} = .0625"$$

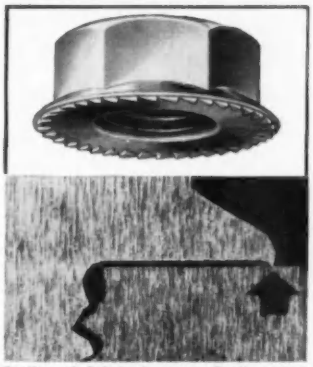
4. When you do have loads to sustain, you must consider required holding power. If metal thickness doesn't allow ample thread engagement (so that threads strip), use more smaller diameter screws. They engage more threads. Limiting factors: the screw's torsional strength, and the effort to drive it.

5. If, due to material thickness, screws fail by torsion or drive too hard, select cutting screws (1, F, or 23). For hard ductile materials, the Type 1 is best; for soft, friable materials, the Type 23.

Two basic ways to keep fasteners tight



RB&W high strength bolts permit optimum tightening without crushing surface when used with hardened washer.



Section of Spin-Lock screw. Teeth embed only with proper tightening. Same feature available in nuts.

Fasteners that stay tight keep joints strong. Resistance to loosening depends largely upon: (1) The inherent "locking" ability, (2) The man with the wrench.

HIGH PRELOADING

With rigid type joints, one of the best "locking" fasteners is a standard RB&W high strength bolt or cap screw . . . *torqued up close to its yield strength.* It locks by its own internal residual tension.

High tension not only keeps it permanently tight, but also prevents fatigue, assures optimum load capacity and safety.

INTEGRAL LOCKING DEVICE

Suppose the design of fastened members can't take full advantage of such preloading? Then a lock is needed, such as that furnished by RB&W Spin-Lock® screws and nuts. Ratchet-action teeth bite into seat; require 20% extra torque to loosen.

Note that Spin-Lock fasteners seat solidly before locking. The installer can't be deceived. He *has* to tighten properly before feeling resistance.

In both cases above, *positive* tightening assures positive fastening.

Send for Bulletin on Spin-Lock fasteners, or call your local RB&W Fastener Man. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

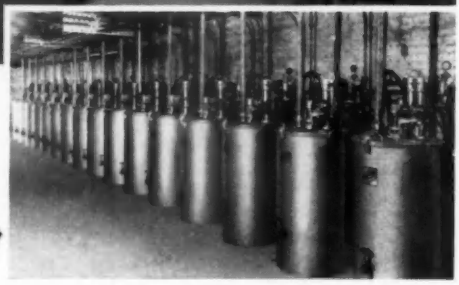
Plants at: Port Chester, N.Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. Additional sales offices at: Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco.

Staked acorn nuts lock securely

Staking opposite sides of these RB&W acorn nuts deforms threads for a positive grip. It also puts middle of nut slightly out-of-round, for a spring tension locking effect. They're designed for applications such as outdoor furniture, where anchoring fasteners is more important than solid seating. Available in aluminum, steel, silicon bronze.

These all-metal nuts can also be furnished in regular double chamfered style. Since they lock with their middle threads, they can be turned onto screw from *either* side.

One of several station wagon body finishing lines at the Ionia Manufacturing Division of the Mitchell-Bentley Corporation, Ionia, Michigan.



Typical central storage, mixing and pumping room for the Binks paint circulating system.

AT LARGEST INDEPENDENT STATION WAGON PRODUCER...

Binks 47-color circulating system permits fast changes – perfect match

At Ionia, a 16-mile pipe system supplies 47 different automobile finishes to spray booths in two separate production lines. One line applies lacquer to General Motors products and the other, enamel, to products of the Ford Motor Company.

Efficient handling and positive control of finishes. In central mixing and storage rooms, finishes and thinners are proportioned into 60-gallon tanks under laboratory control and safety. Each color has its own set of tanks. Air operated agitators keep the finishes mixed. Powerful Binks air-operated pumps circulate the finishes through pipes to each spray station and back to the tanks. A second tank takes over when the first is empty, to insure continuous production.

Identical finishes at each station. Color and viscosity on any circulation line is identical throughout the plant. At each spray station Binks air and fluid pressure regulators for each color govern the rate of application. Binks spray guns are used throughout.

For complete information on how Binks paint circulating systems can (1) improve the handling and control of finishes and (2) increase safety standards by localizing mixing and storage operations—get a copy of Bulletin 701. Better still, call in a Binks engineer for suggestions that meet your specific requirements. Contact your nearest Binks Branch Office or write direct to the address below.

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Open to all...NO TUITION...covers all phases.

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BUSINESS PULSE

(*Continued from page* 130)

Government Spending

In the case of spending by State and local governments, for example, there seems no logical reason for assuming anything other than a continuation of the uptrend which has characterized the whole postwar period. In dollar amounts, this would suggest a rise of something between $2 billion and $3 billion.

There is general agreement that our net foreign investment position (the balance of all exports over all imports) will decline by upwards of $1 billion in 1958 and thus tend to reduce gross national product by a commensurate amount. This would represent a retreat from the exceptionally favorable net export position reached in 1957, partly as a consequence of the Suez crisis. The probability of such a retreat is enhanced by the fact that many foreign economies experienced a heightening of exchange difficulties during the past year, as well as a leveling out of economic growth.

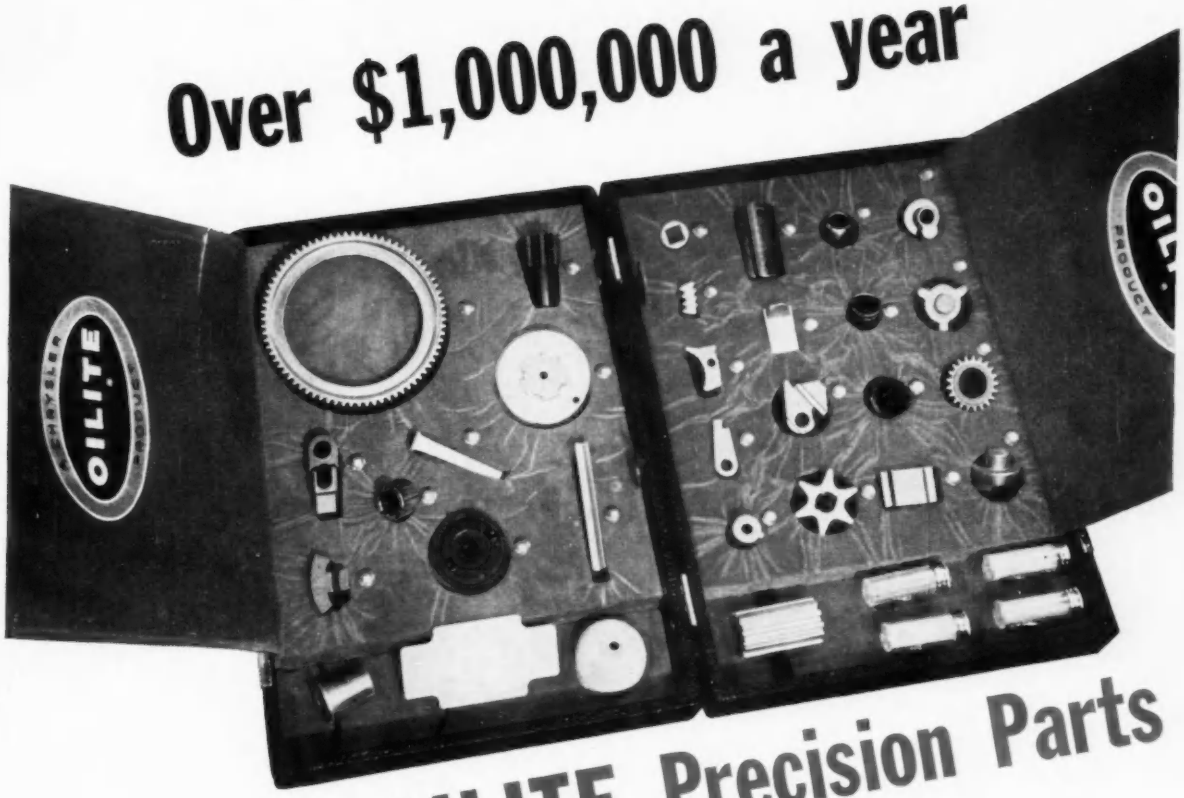
New Transfer Machines for Chevrolet Rear Axles

(*Continued from page* 57)

drilled holes at Station 9. The two outer holes then are pierced at Station 10, maintaining the same angular alignment. This is done by means of a special Richard Bros. punch and die set, producing a hole with a flat at the top section. Here, too, alignment is important, the flat section being produced normal to a line at 8 deg, 56 sec from the normal vertical axis of the flange.

Adoption of transfer machines for these operations on the Chevrolet rear axle housing provides an interesting example of how changes in product design, even though they may not be extensive, affect the selection of manufacturing methods and equipment.

Over $1,000,000 a year



saved with OILITE Precision Parts

This kit contains intricate parts used by a score of companies who save over $1,000,000 annually by specifying Oilite*!

These companies are typical of many manufacturers of appliances, machinery, automotive accessories, power tools and other products who enjoy the substantial cost reductions made possible by Amplex Powder Metallurgy.

There's no better way to stay ahead of competition. Chrysler-engineered Oilite Precision Parts can reduce your parts' cost up to 55% or more when produced in volume. What's more, Oilite powder metal parts are tough and long wearing. They're available in various metals and alloys to meet desired properties.

Your local Oilite Engineer will be glad to provide complete information on any application. Furthermore, he will gladly survey all the parts you now buy for possible cost reductions *at no obligation*. Look for him in the Yellow Pages of your telephone directory under "Bearings — OILITE" or write to Dept. K-1.

TYPICAL PROPERTIES OF STEEL OILITE* PRECISION PARTS

(Grades)	A	AC	AH
Fatigue Strength (Psi) 10,000,000 reversals	24,000	-----	------
Ultimate Tensile Strength (Psi)	35,000	50,000	120,000
Compressive Strength (Psi) .001" permanent set	25,000	80,000	150,000
Elongation in 1", % minimum	10	5	1
Brinell Hardness	80	140	300
Shear Strength (Psi)	27,000	35,000	100,000

* Many other materials giving different properties available.

Engineers in the principal cities in US and Canada.

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Trends in the CONSTRUCTION EQUIPMENT INDUSTRY

(*Continued on page 87*)

be increased by $25 million annually until Federal funds reach $1 billion a year, which, with matching state funds on a 50-50 basis, would provide for an annual program of $2 billion.

Heavy Duty Fork Lift Machine

A giant fork-lift machine which can lift 22-ton loads of various materials has just been built for a West Coast firm by R. G. LeTourneau, Inc., of Longview, Texas.

Many types of materials normally handled in unpaved areas—ranging from steel products to precast concrete structures—are said to offer work opportunities for this type of rough terrain fork lift. The first unit delivered, however, is being used for handling redwood logs at a California mill.

Depending upon the type of materials to be handled, the machine can be furnished with fork, crane, ram, fork and tusks, or fork and jointed tusks.

Highway Expenditures

Total expenditures for highway purposes in 1957 have been estimated by the Bureau of Public Roads at $9,098,000,000, broken down as follows:

Capital outlay	$5,770	millions
Maintenance	2,044	"
Administration	350	"
Highway police	154	"
Interest	318	"
	$8,636	"
Obligations retired	462	"
	$9,098	"

Receipts from highways also showed increases during 1957, amounting to $8,083,000,000, the Bureau of Public Roads reported.

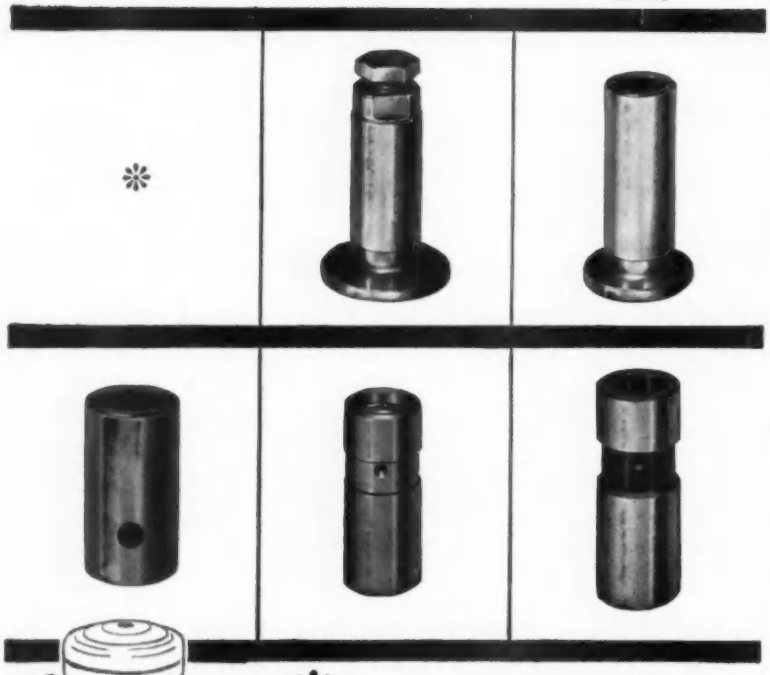
New Fullpak Scraper

LeTourneau-Westinghouse Co. has announced a new 18-cu yd scraper for use with tractors of 90 or more horsepower, a comparison unit to the 27-cu yd model introduced earlier in the year in the Fullpak line of scrapers. The new model, designated the CT, has a 9½-ft three-section blade, low center of gravity for maximum stability, and a bowl floor that provides more than 46½ sq ft of load base.

Taxpayers Dollars Diverted

Diversion of state taxes levied upon highway users for non-highway purposes reached an all-time high of $325,300,000 in 1956, the National Highway Users Conference reported. This amounted to 7½ cents of every dollar paid by highway users that year.

JOHNSON *tappets*



keep pace with today's engines

Continual experimentation and excellent manufacturing methods show a steady product improvement that make JOHNSON TAPPETS worthy of your consideration. Only proven materials, covering a range of steel, chilled iron, and various iron alloys are used in the manufacture of JOHNSON TAPPETS, providing greater strength, light weight and increased wear resistance. Serving the AUTOMOTIVE — AIRCRAFT — FARM — INDUSTRIAL — MARINE Industries.

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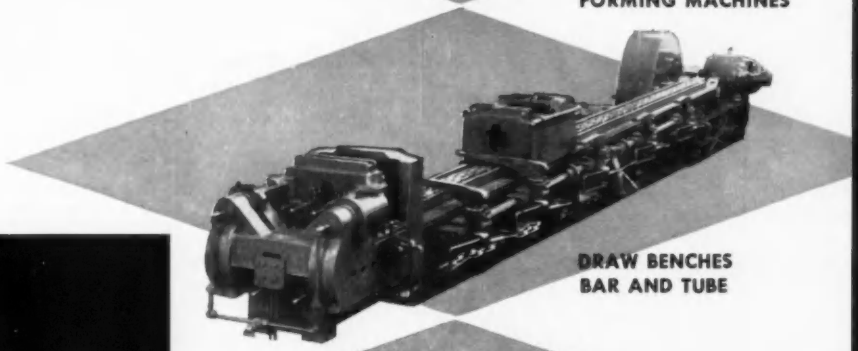
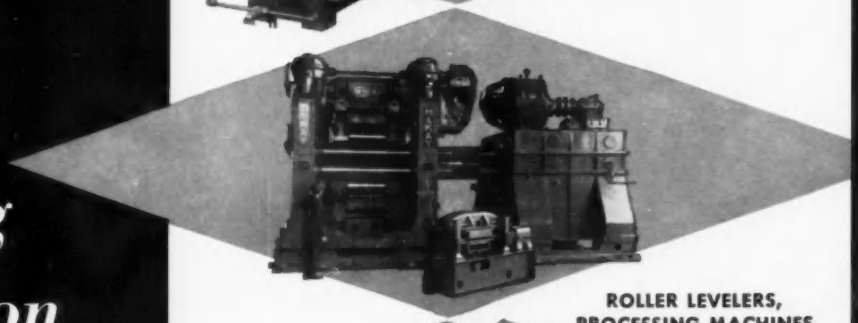
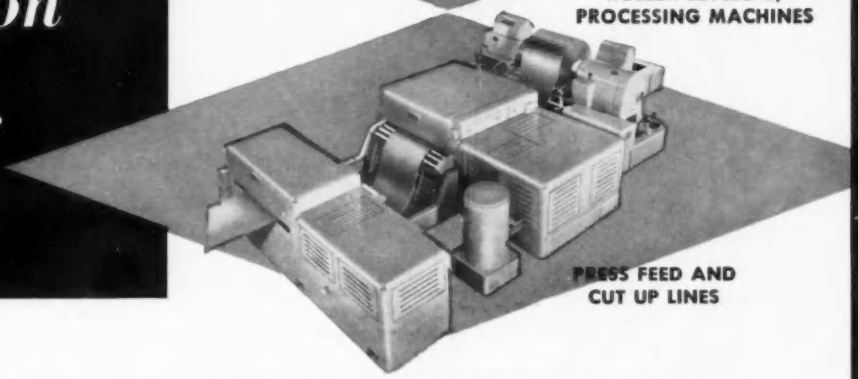
TUBE MILLS AND
FORMING MACHINES



DRAW BENCHES
BAR AND TUBE



ROLLER LEVELERS,
PROCESSING MACHINES



PRESS FEED AND
CUT UP LINES

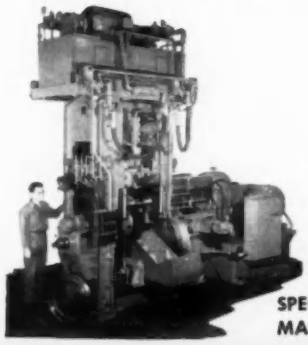
Metal working Automation in action...

If you're in the metal working business, you should be acquainted with McKay *automated* lines available for many metal working operations.

McKay pioneered and has played a leading role in the development of such equipment as that pictured on this page.

Basic McKay designs can be modified, or special machines developed to meet specific requirements.

THE McKAY MACHINE CO., YOUNGSTOWN, OHIO



SPECIAL
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For prompt service, contact one of The Garlock Packing Company's 30 sales offices and warehouses in the U.S. and Canada, or write

United States Gasket Co., Camden 1, N. J.

United States Gasket *Plastics Division of* GARLOCK

Aircraft Industry Enters 1958

(Continued from page 53)

result from increased deliveries of guided missiles and commercial aircraft, especially turbojet and propjet transports. The latter will more than offset the anticipated continuing decline in unit deliveries of military aircraft. By the end of 1958, deliveries of guided missiles may exceed 45 per cent of the total military sales of the industry.

Since military requirements for 1958 are not now firm, it is difficult to forecast with any degree of accuracy employment in the industry for 1958. It would appear at this time that total employment will drop well below the 800,000 mark and that additional facilities will be closed. There will be no consistent pattern, company by company, with regard to employment and levels of activity.

In fact, it is anticipated that new plants especially adapted for fabrication of new weapons will be opened at the same time other facilities will be closing down. Moreover, despite the reduction in total employment, there will be a continuing requirement for highly qualified scientists and technicians.

• • •

Two-Door Hardtop Tops Sales of Edsel Models

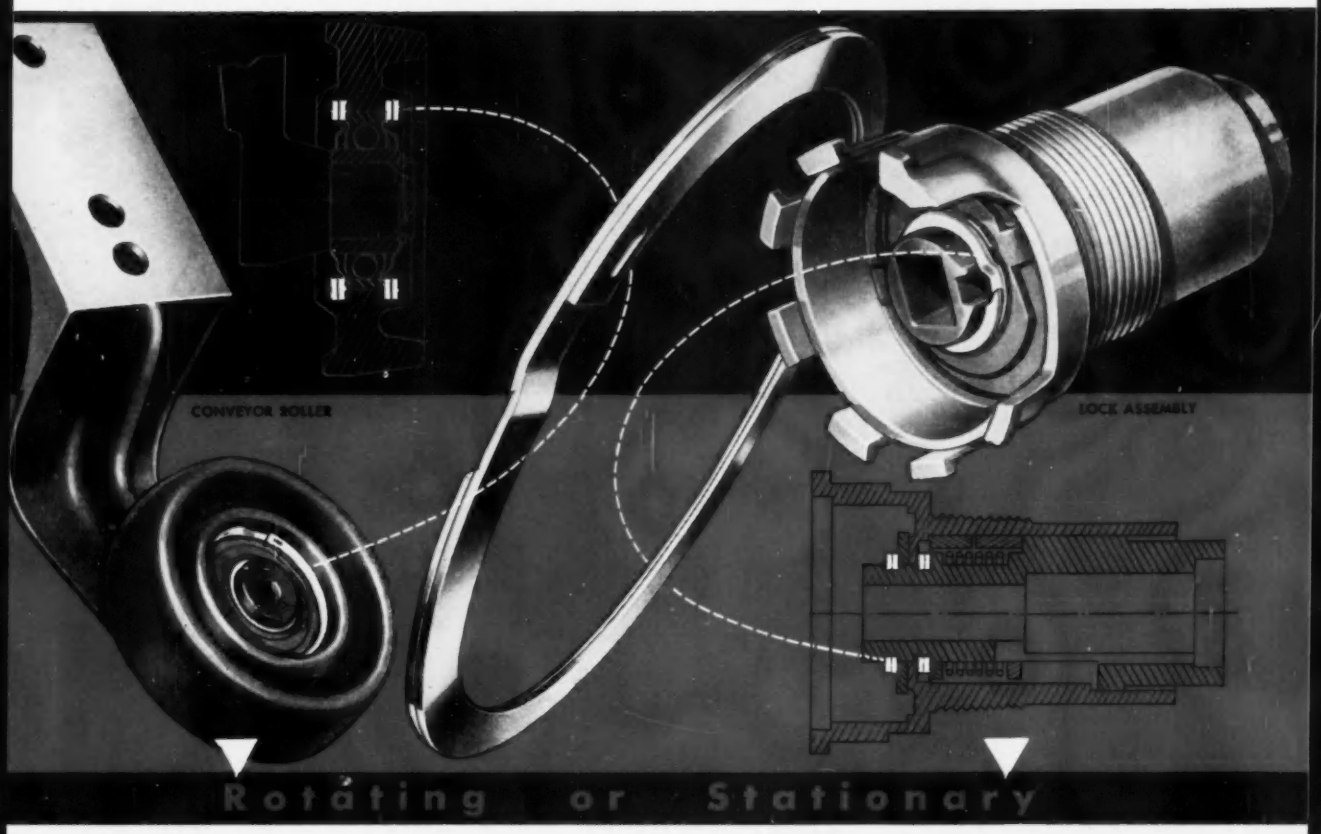
Edsel Division has found that the two-door hardtop, accounting for 30.7 per cent of sales, is the best selling of the new Edsels. Four-door hardtops account for 28.8 per cent of sales, according to a report from the division.

The report also revealed that one out of ten Edsels sold is a station wagon. The two lower priced series, Ranger and Pacer, account for 64.3 per cent of sales.

The pushbutton automatic transmission gear selector is being installed on 96.1 per cent of all Edsels built, and 56 per cent of the cars have power steering.

AUTOMOTIVE INDUSTRIES KEEPS YOU INFORMED

there are hundreds of ways in which Industry uses **SPIROLOX** to solve retaining problems



assemblies retained with SpiroLox look neater, last longer, use fewer parts, are easier to take apart and put together

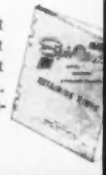
Wherever parts rotate, wherever parts are to be secured on shafts or in housings, wherever moving parts must *hold* together —Spirolox Retaining Rings do the job better! Even on rotating assemblies, as shown in the conveyor roller application at left above, Spirolox attains neat, compact, simplified design. The stationary application of a lock assembly (right above) illustrates how Spirolox can be applied in those hard-to-reach places where the retaining ring must operate in a very confined space.

Exclusive Spirolox Design makes possible a variety of applications that is almost limitless. Secret of this design is the patented Spirolox *two-turn construction*, which ELIMINATES THE GAP and makes possible a UNIQUE LOCKING CHARACTERISTIC. A step or offset, formed in the ring so that the two turns are parallel, *bridges the gap* found in conventional retaining rings. Result: better conformability, even in the most restricted places. The effective locking property of Spirolox is created by a "friction lock", formed under thrust between the two turns. Result: greater holding power to make the ring STAY PUT in its groove.

The success of Spirolox construction proves itself not only in superior operation. It also makes possible easier installation, less-complicated machining, simplified servicing and quicker dismantling of assemblies retained the Spirolox way. These compact spring-steel rings spiral into their grooves easily, saving many man-hours in manual installation. Spirolox Rings adapt easily to fixtures for automatic production line installation. They eliminate costly machining and special tools. Spirolox Rings facilitate maintenance and servicing in the field because they come out at the flip of a screwdriver, ready for re-use. Thus, factory-adjusted or assembled units REMAIN UNCHANGED, even after repeated dismantling operations during servicing or repairs.

HANDY, ILLUSTRATED SPIROLOX CATALOG is yours without cost or obligation. It may be your key to simpler, lighter, more compact machinery or parts. If you wish, send us a print of your product and our engineers will point out Spirolox application possibilities. **Thompson Products, Inc., Piston Ring Division (Ramsey Corporation) Dept. H, St. Louis 8, Mo.**

U.S. Pat. No. 2,450,425 and Foreign Pats. Other Pats. Pend.



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Republic

POSITIVE HOLDING-POWER of Republic Nylok Bolts keeps striker plate in precise position to assure proper functioning of safety door-latch. Other advantages of Nylok Bolts include their liquid-sealing ability. When unit is fully seated in tapped hole, nylon pellet blocks escape of fluid around helix of threads.

REPUBLIC

REPUBLIC STEEL

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Nylok® Fasteners Assure Positive Performance

of Safety Door-Latch Design

There is no room for error in safety engineering. Not even in the smallest detail. That's why Ford Engineers use Republic Nylok Bolts to anchor striker plate to door post.

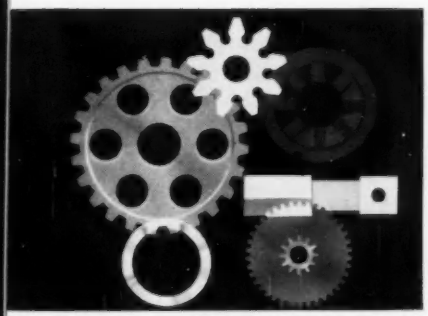
Nylok Bolts permit precise positioning of striker plate to safety latch during assembly. When torqued tight they provide a positive, vibration-proof clamping action to keep the plate locked in place. Holding-power of latch assembly is permanently maintained.

Republic Nylok Bolts have proved ideal for a wide variety of bolted assemblies subject to impact or vibration. Their relentless grip is produced through compression of a small nylon pellet imbedded in the bolt body when unit is wrenched into threaded hole. In attempting to regain its original shape, the pellet exerts a continuous, powerful lateral thrust, forcing a strong metal-to-metal lock between opposite mating threads. Lock is positive, whether or not bolt is seated. Further, this resiliency of nylon provides excellent adjustment and re-usability characteristics, and permits relatively soft materials to be locked to threaded members without damage.

In addition to design advantages, use of Republic Nylok Bolts offers many production savings. They can be hand or power wrenched with equal effectiveness. There is no galling of threads or seating surfaces. Expense of assembling extra locking devices or wiring is eliminated.

Finally, you get all the advantages of Nylok locking plus top fastener quality when you specify Republic Nylok Bolts. Complete manufacturing control from ore to finished product is your assurance of consistent peak performance.

For full information, contact your nearest Republic office. Or mail coupon.



PREDICTABLE PERFORMANCE of Republic Iron Powders is assured by our exclusive manufacturing process which provides Controlled Dimensional Factor, or CDF. This characteristic is furnished in three types of powders—Type "G" for growth, Type "N" for normal (no dimensional change) and Type "S" for shrinkage after sintering. Result is fast, accurate, economical iron powder sinterings. Send coupon for details.

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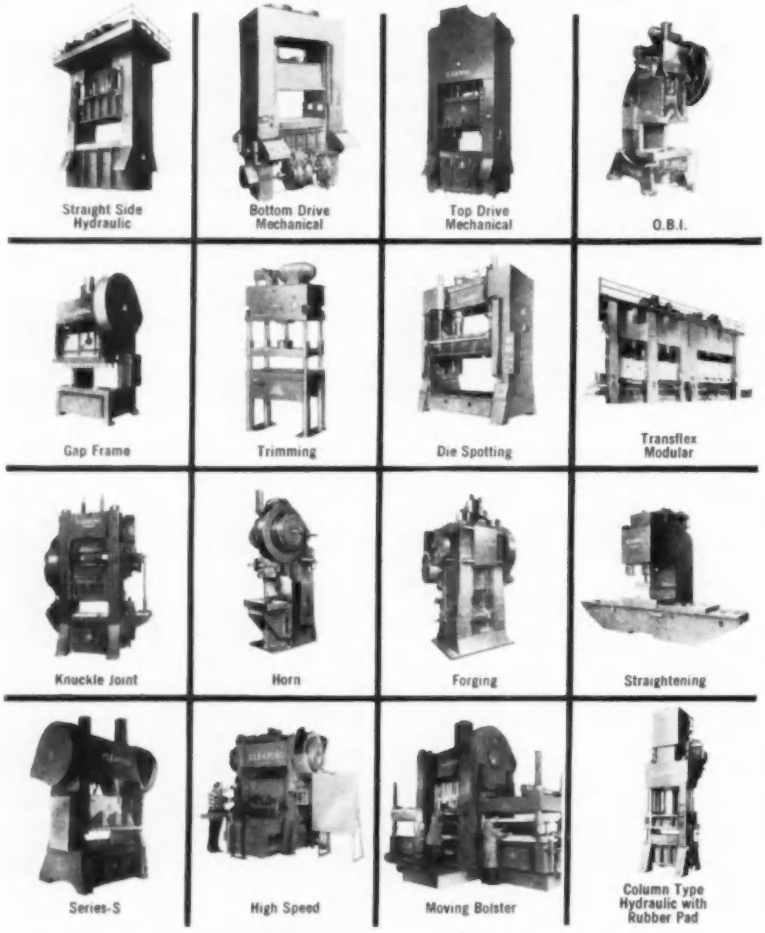

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INDUSTRY

Reviews and Previews

(*Continued from page* 120)

member companies in the U. S. While only 50 per cent of the companies replying indicated that they planned any expansion at all, the extent of this planned expansion ranged from 5 per cent to 600 per cent. However, most of the companies planning to expand more than 10 per cent were smaller companies. Planned expansion for large companies varied in the main between 5 and 10 per cent.

Certain areas of the plastics industry indicated more planned plant expansion than others. Those indicating substantial expansions in their operations included epoxy resin producers, manufacturers of plastics bottles, housewares, pipe, toys, reinforced plastics, cellular plastics, specialized machinery producers, and sheet formers.

Cellular plastics, also known as foamed plastics, produced from basic resins such as vinyl, urethane and polystyrene, exceeded 30 million lb in 1957. This was approximately a 100 per cent increase over the 16 million lb produced the previous year.

One of the outstanding developments in the plastics industry during 1957 was the availability of high-density polyethylene, a new olefin plastic with superior properties that promises to open many new markets to plastics. Late in 1957, a second member of the olefin family, polypropylene, made its appearance.

The squeeze on profits in the plastics field may be expected to intensify further. Certain branches of the industry, particularly those in their early growth stages, should forge ahead volume-wise, but it is doubtful if this will offset declines elsewhere during the early months of the new year.

A rise in defense spending of some $2 billion by the second half of 1958, along with easier money rates, may be the start of a renewed upturn for plastics. It seems

reasonable to expect a one or two per cent overall increase in plastics output this year.

ROADBUILDING

WHEN expenditures for highway construcion completed in 1957 are eventually added up, they will show that the year has been a record-breaker. Outlays (exclusive of right-of-way and advance engineering) will reach $4.6 billion—$500 million more than in 1956—according to Louis W. Prentiss, executive vice-president of the American Road Builders Association.

Roughly speaking, $2.6 billion of this total will have been spent on State and local roads and toll facilities, financed independently of the Federal Government. The remaining $2 billion will represent funds invested in work put in place as a result of joint Federal-State financing under the Federal-aid highway law.

The Federal-aid program can be divided into two general classifications:

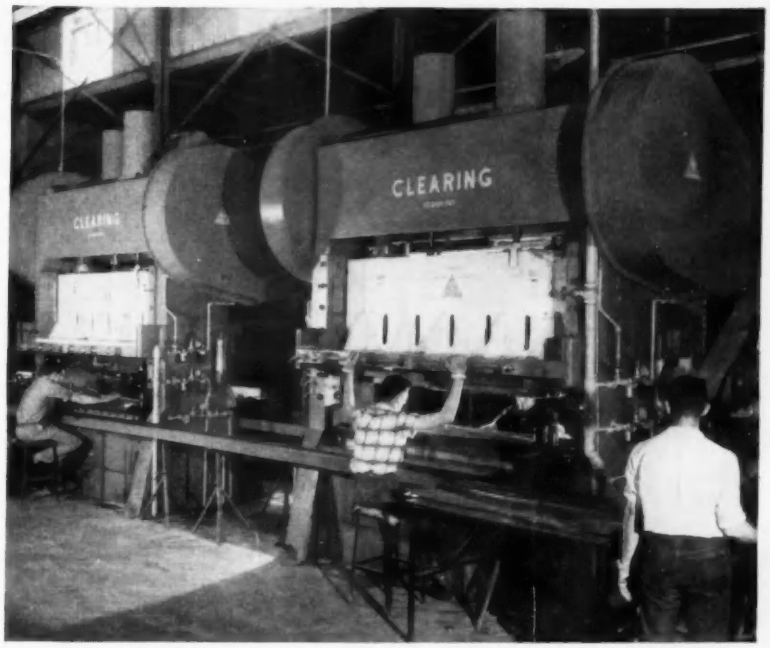
1. The Interstate and Defense Highway Program calling for 90 per cent Federal aid.
2. The Primary, Secondary and Urban Highway Programs calling for 50 per cent Federal aid.

The Interstate Program during 1957 resulted in expenditures for construction completed of about $250 million in Federal and State funds. The Primary, Secondary, and Urban Programs provided similar expenditures of about $1.75 billion.

The year 1958 will see a further rise of at least 15 per cent in total expenditures, which should bring net outlays for all highway construction to about $5.3 billion. The acceleration in 1958 will reflect the impact of greatly increased grants of Federal aid to the States. Spending on toll roads will be tapering off, and non-Federal-aid work in the States may be expected to remain at about its present level.

There will be a slight increase in work accomplished this year on the Federal-aid primary, secondary

(*Turn to page* 149, *please*)



CLEARING SERIES-S PRESSES

ARE TOPS AT CENTRAL METAL PRODUCTS COMPANY
BLYTHEVILLE, ARKANSAS

No question about it, Central Metal Products is really set up to knock out a job in record time. Their seven Clearing Series-S presses include 125 and 150 ton capacities. These straight side machines give Central the bed size to handle the outsized stainless steel automotive moldings being produced above. Two point slide suspension and full gibbing controls parts accuracy and adds mileage to die life.

Press maintenance? Practically non-existent. That's important in a conveyorized production operation like this.

Clearing has a new catalog that tells all about these versatile Series-S presses. We'll be happy to send you one. Write today!

Seven testimonials to the efficiency of Clearing Series-S presses are lined up in Central's modern press room.

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the way to efficient mass production

CLEARING MACHINE CORPORATION *division of* U.S. INDUSTRIES, INC.

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Born December 7, 1957... Already 70 Years Old...

with greater Facilities for serving YOU!

Leading manufacturer of passenger car and truck frames, air and vacuum power brake systems for trucks, trailers, buses and passenger cars, as well as other air controls —

THE MIDLAND STEEL PRODUCTS CO.

merges with

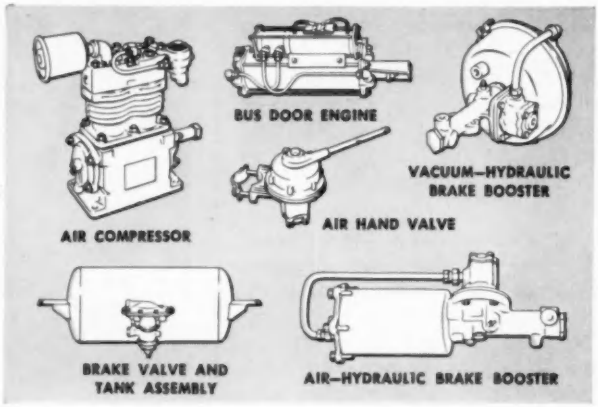
veteran designer and builder of engineered atmosphere systems for all major industries —

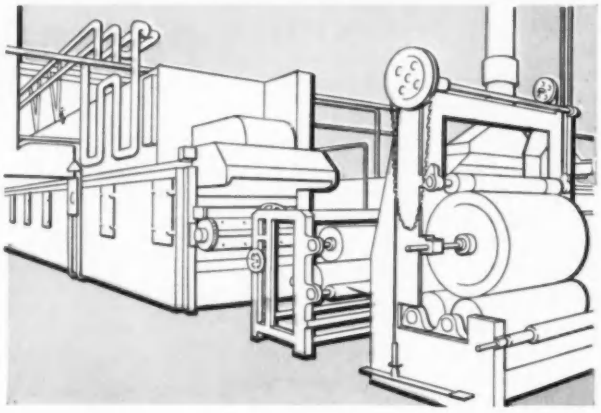
J. O. ROSS ENGINEERING CORPORATION *and Subsidiaries*

to form

MIDLAND-ROSS CORPORATION

with greater facilities, more manpower, and additional products to serve you, the customer!





Ross Plastic Treating Line handles entire processing, from coating to rewinding.

Seventy years of combined business and development experience are now available to present and future customers of Midland-Ross Corporation, with its 6500 employees, 10 manufacturing plants, and $100,000,000 sales volume.

While each division will continue a decentralized form of operation, there will be substantial pooling of engineering talents for research and development, resulting in accelerated improvements in M-R's products and services.

We will welcome — and appreciate — every opportunity to serve you.

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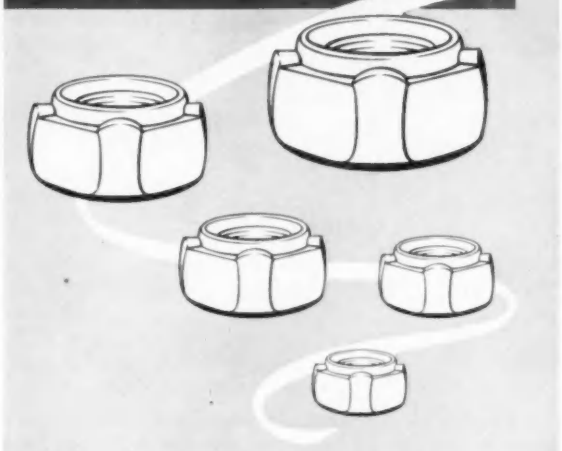
the WELD NUT Division



Available in a wide range of sizes, Midland Welding Nuts are a simple, low-cost means of insuring bolted unions at hard-to-get-at places.

If you're a manufacturer of metal parts, you can enhance your product appeal and at the same time pass along substantial savings to your customers by using Midland Welding Nuts.

Inquire about this economical convenience today. You'll be glad you did. Contact General Sales Manager, c/o Midland-Ross Corporation, 6660 Mt. Elliott Avenue, Detroit 11, Michigan.

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check these features:

- High shear and tensile strength.
- Uniform high clinch and preload.
- Positive mechanical lock.
- Excellent sealing qualities.
- Fast, quiet installation.
- Low installed cost.
- Easy removal.
- Your choice of materials and head styles.

Huck fasteners offer you maximum uniform strength, high production, quiet application at advantageously low installed cost. There is a HUCK fastener to fill your need. Write for our condensed Commercial Catalog (No. 8-414) or a HUCK Fastener Consultant will call at your request.

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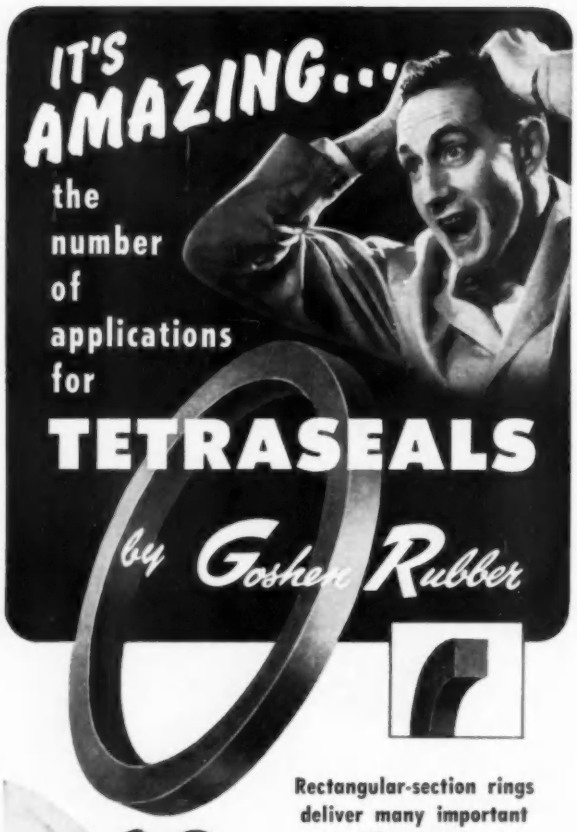

Rectangular-section rings deliver many important advantages!

Design engineers tell us TETRASEALS are not only amazingly high in performance, but amazingly versatile as well . . . using them in place of O-rings for static and in some cases moving applications. TETRASEALS are money-savers because they're interchangeable with standard O-rings, use the same groove, require no special tooling, and possess a homogeneous structure (non-laminated).

Edges are accurately formed, and cross-sectional tolerances are held to ±.003 (depending on ID and OD, on cross-section sizes and on material required).

Only Goshen can supply TETRASEALS . . . in natural, synthetic and silicone rubber compounds to meet MIL, AMS, SAE, ASTM and industrial specifications.

Write for Technical Bulletin No. 11.

Goshen Rubber Co., INC.
2718 S. TENTH ST. GOSHEN, INDIANA

Simplified Storage System for Semi-Automatic Tooling

(*Continued from page* 56)

length of the piece in order to supply lubrication to the pilot bearing when the shaft is in service. The output end of the shaft is then tapped to accommodate a grease fitting, and the input, or clutch end, is then threaded. Upon completion of all operations the shaft passes through final inspection prior to being sent to finished stock.

By turning these shafts on profiling lathes, Twin Disc is able to get semi-automatic production in this most important fabricating operation. As the only tools to be stored are the templates, the entire tooling for the more than 150 shaft models can be stored in a single bin. By using heat treated bar stock as the raw material, heat treating, cleaning and straightening costs are reduced greatly when compared to heat treating each piece.

ON OUR WASHINGTON WIRE

A related proposal which is expected to stir up some controversy is the Administration's request to join the Organization for Trade Cooperation (OTC), a planned international body to administer an existing 33-nation trade-tariff agreement.

Ike's plea for strict economy in order to make more funds available for military projects falls on deaf ears in Washington. Neither party is willing to vote fewer dollars for nonmilitary projects such as farm handouts or veterans' benefits for fear of arousing voter wrath in an election year.

Tomorrow's students will need more education than their parents had. Top education experts in Government say the U. S. must put a much larger share of the gross national product (now up to $435 billion a year) into education. Also urged: Study of the length of the school year and the use of school plants.

More firms will get a chance in 1958 to bid on Government contracts. The Pentagon is being told by Congress to move away from practice of secretly choosing the firm it wants to do business with and then negotiating price and conditions behind closed doors. Under this method, some companies never hear about opportunities to bid on Government business. This has resulted in a dwindling list of suppliers.

Despite rising unemployment, labor unions will press hard for wage increases in 1958. Union bosses admit that the sag in production has taken some steam out of the drive for bigger paychecks. But they're under pressure from the rank-and-file to push for higher pay, more benefits, and shorter hours.

bright idea

For enduring beauty that sells in a new car and
re-sells in a used car . . . design it, improve it and protect it
with McLOUTH STAINLESS STEEL.

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HIGH QUALITY SHEET AND STRIP

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MANUFACTURERS OF STAINLESS AND CARBON STEELS

Tru-Stop Brakes

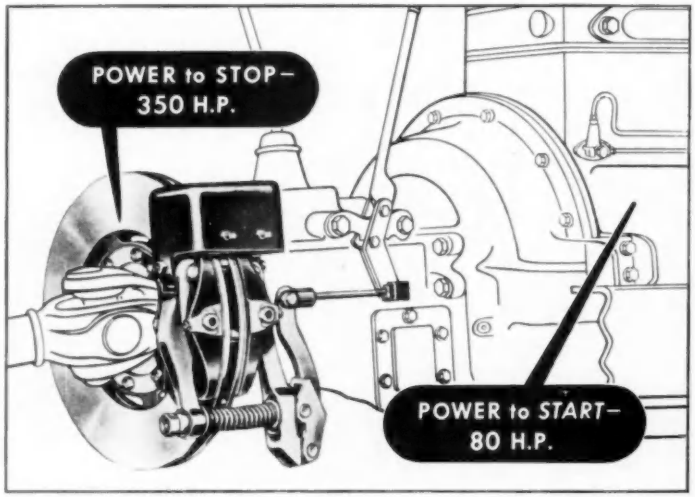
Meet Every Heavy-Duty Safety Requirement

OFFER POSITIVE PROTECTION AGAINST RUNAWAY OR PARKING ACCIDENTS—AT LOWEST COST

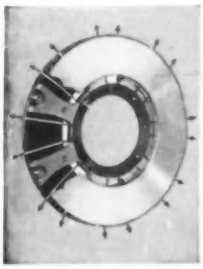
HERE IS WHY:

They have surplus power required for emergency service—no dangerous self-energizing

TRU-STOP Heavy-Duty Emergency Brakes are not only excellent parking brakes. They serve as a complete, independent and fully reliable braking system. Operating on the propeller shaft they enable the driver to continue on safely in the event of service brake failure. TRU-STOP brakes have the surplus braking capacity to be used *repeatedly* as an auxiliary to service brakes.

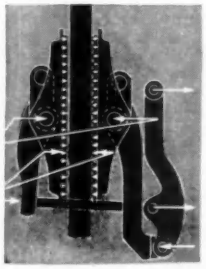


Brakes actually do more work than the engine in terms of horsepower Where it takes 80 HP to accelerate to 20 miles per hour, it takes 350 HP to make a safe stop from 20 miles per hour within required limits



Ventilated to throw off heat

Brake efficiency depends on ability to throw off intense heat —rapidly. Discs of TRU-STOP brakes are exposed to the air even during the braking operation. Ventilated design circulates air *between* the disc plates.



Give uniform brake pressure

Disc of TRU-STOP brakes is "squeezed" between the flat surface of the shoes. Effort applied to brake lever operates front and rear lever arms simultaneously. Pressure is exerted on the center of each shoe. Entire lining surface is in contact.

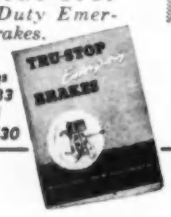
FOR SAFE, ECONOMICAL, HEAVY-DUTY BRAKING WITH MAXIMUM LIFE AND MINIMUM MAINTENANCE

TRU-STOP Brakes are used on a great variety of mobile and stationary equipment

SUCH AS—

- Motor cranes
- Road rollers
- Dump trucks
- Power dividers
- Cooling tower fans
- Oil well pumps
- Cold header presses
- Scrubbing machines
- Wire rope stranders
- Fork lift trucks
- Motor scrapers
- Tractors
- Graders
- Diamond core drills
- Electric locomotives
- Oil well servicing rigs
- Railway inspection cars
- Shapers
- Power take-offs
- Winches
- Motor shovels
- Tractor loaders
- Conveyors
- Hard rock drill positioners
- Mine locomotives
- Power presses
- Railway power ballisters
- Cable tool spudders
- Aerial tram cars
- Tension wire stringers

We will be glad to answer any questions or give you more detailed information about TRU-STOP Heavy Duty Emergency Brakes. Send for Catalogs DH-33 and DH-530



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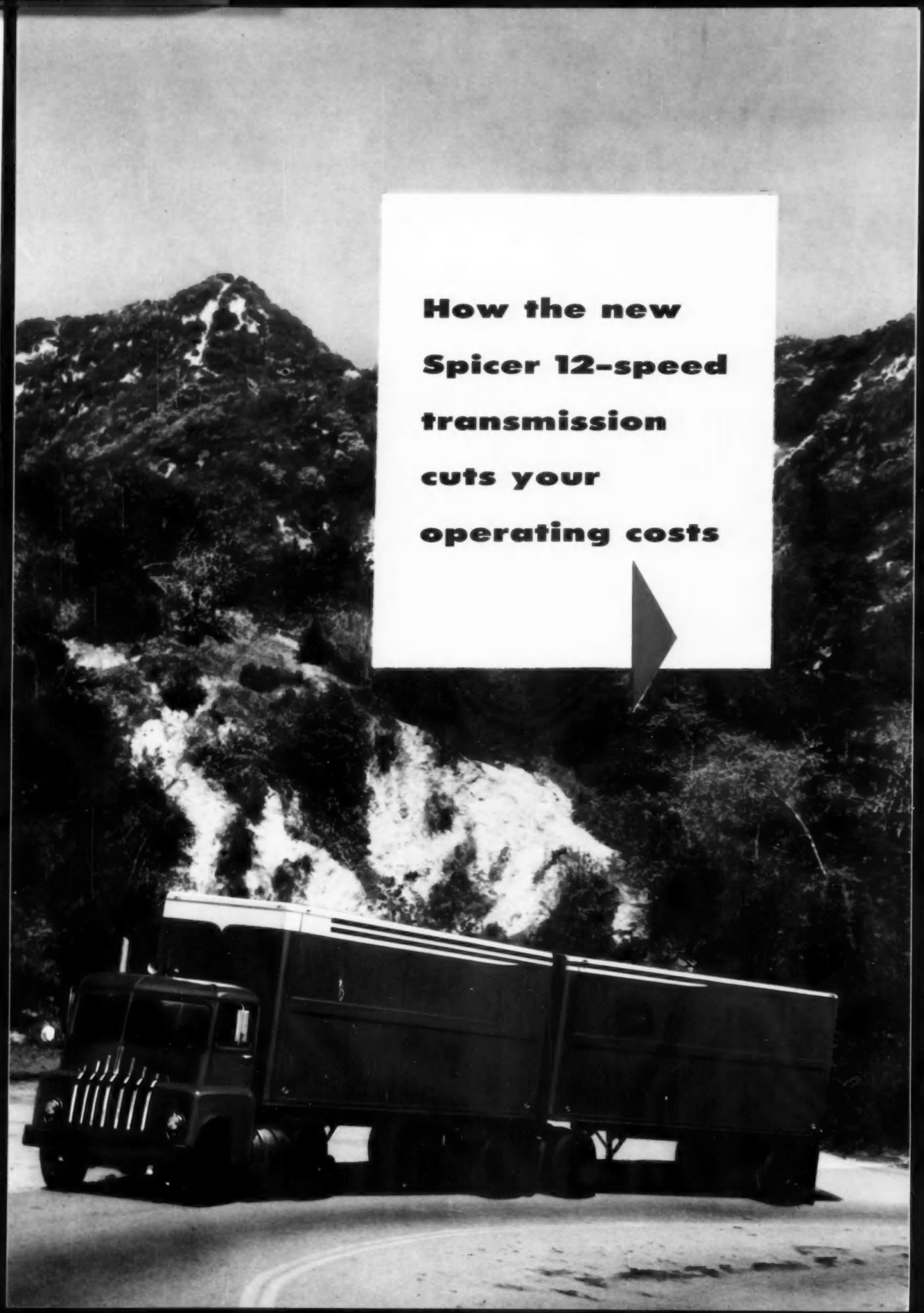
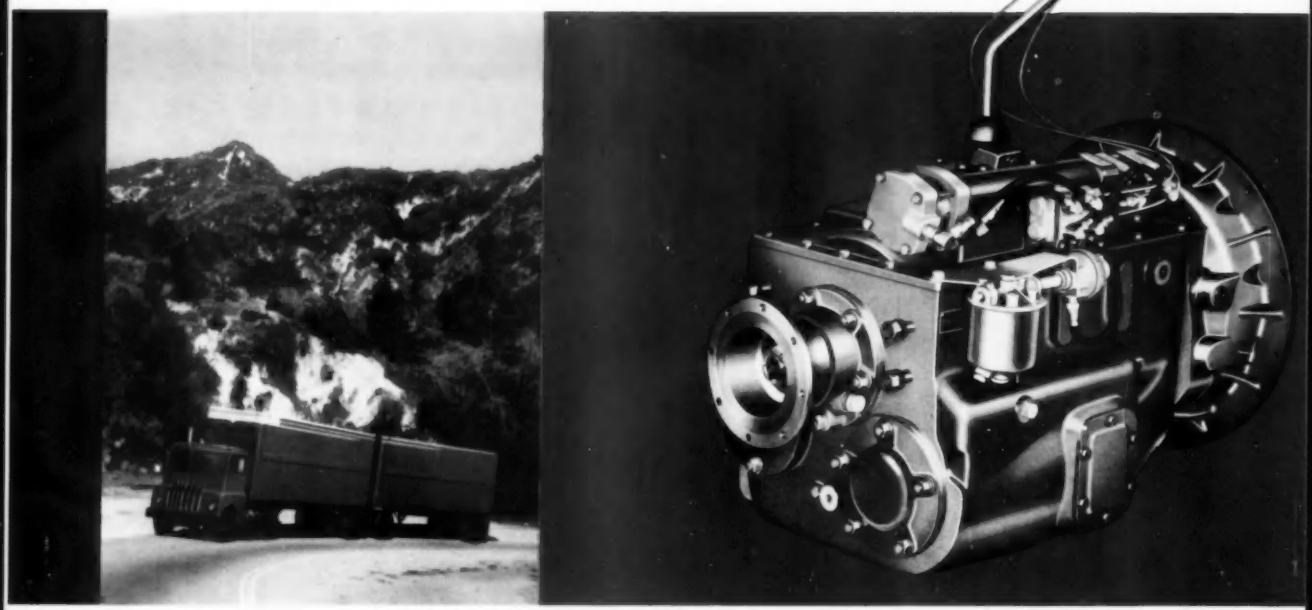

How the new
Spicer 12-speed
transmission
cuts your
operating costs

New Spicer 12-speed Synchro-Master Transmission

lowers fuel consumption and increases payload



12" shorter and 200 pounds lighter than any other multiple-speed transmission of comparable capacity

Produces the close steps required to maintain engine speed at maximum RPM—Avoids engine lugging

No 2-speed axle required

No auxiliary transmission needed

Blocker-type synchronizer in all speeds, forward and reverse

All six low range ratios in reverse • Forced-feed lubrication • Screen for filtering oil • Standard 6-bolt S.A.E. power takeoff apertures on each side • Tower or remote control type • Replaceable bearing retainer inserts in all case bores.

This new transmission is unmatched in efficient power transmission for heavy duty vehicles. There has never been a transmission that has increased both driver and vehicle efficiency so much and at the same time requires so little initial investment and maintenance expense.

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Dana engineers want to help you adapt this revolutionary new Spicer transmission to your heavy-duty truck requirements. Your letter, wire, or telephone call will receive immediate attention.

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MARINE: Universal Joints, Propeller Shafts, Gear Boxes, Forgings, Stampings.

Many of these products manufactured in Canada by Hayes Steel Products Limited, Merritton, Ontario

DANA
Spicer

INDUSTRY

Reviews and Previews

(*Continued from page* 141)

and urban roads. An increase of $50 million in these programs will be generated by a $25 million increase in Federal aid.

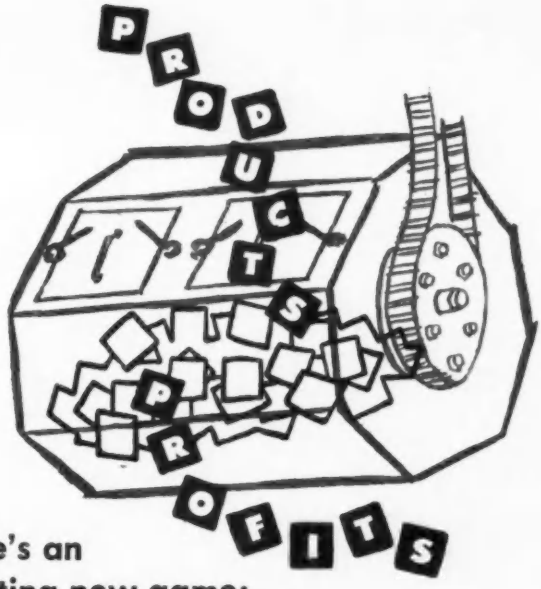
The really significant boost, however, will come from construction on the 41,000-mile Interstate System. Federal funds have been apportioned to the States for this work during fiscal years 1957, 1958, and 1959 in the total amount of $4.875 billion. All but $175 million of this is offered as a 90 per cent Federal grant; the $175 million, apportioned under the 1954 Highway Act, is on a 60 per cent Federal and 40 per cent State basis.

These sizable Federal funds for the Interstate System have been made available faster than State projects can be initiated, rights-of-way obtained, preliminary engineering accomplished, and contracts advertised and let. This was anticipated and is, in fact, according to plan. The result is that about $2 billion is now ready to be obligated by the Federal Government upon submission of projects by the States.

Over $800 million more in Federal funds has been earmarked for specific projects, but neither engineering nor right-of-way steps have been started. Still another $700 million in Federal money is being spent on these two necessary steps preliminary to advertising for bids.

The U. S. Bureau of Public Roads reports that about $1 billion worth of actual Interstate highway construction (exclusive of preliminary engineering and right-of-way) is now underway. This includes money contributed by the States.

The lead time on an average Interstate project is 21 months, and the average time for completion of construction of a project is 24 months. Thus, there is an average interval of nearly four years from the date a project is programmed and Federal aid funds obligated until it becomes a completed facil-



Here's an exciting new game:

PUT your products in the barrel
TAKE your profits out

One of the greatest money-saving opportunities in metalworking lies in the use of barrels to finish parts by the hundreds in place of conventional methods that finish one part at a time.

Barrel finishing makes easy work of many tough jobs of grinding, deburring and buffing by wheel.

One Oakite customer changed to barrel methods to deburr curved stainless steel strips that are 14 inches long. The cost for deburring 20,000 strips was reduced from $3,000 to $125.00.

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ity. These factors must be borne in mind in assessing the rate of progress on the Interstate Program, which began virtually from scratch 18 months ago.

As to uniformity of progress, States which have a heavy proportion of urban projects, on which right-of-way acquisition is slow and expensive, will show a slower rate of progress and a higher investment in advance costs than States engaged mostly in rural projects. As the entire program advances, however, the state-by-state unevenness will smooth out, and progress in relation to requirements will become much more uniform.

Material Handling

THE $2 billion a year material handling equipment industry expects 1958 sales to produce a dollar volume equal to 1957, or reflect an increase of up to five per cent. Executives of member companies of the Material Handling Institute feel that sales during the first half of the year will be of the same volume as those booked during the last half of 1957. A definite upswing is predicted during the latter half of the year as a result of the growing interest by industrial buyers in all kinds of cost-cutting equipment.

Dominant practice in material handling today is to employ an integrated system: using trucks for unit load handling; employing conveyors for certain other phases; supplementing them with such other tools of material handling as hand lift trucks, pallets, automatic dispatching, etc. The resultant higher productivity or output of manufacturing areas, machines, and labor stimulates cost reduction and increased profits.

Since industrial management appears to be making a firm effort to stem rising costs, MHI indicates that there is a good chance in 1958 for a "re-equipment boom" in buying. According to R. L. Fairbank, MHI president, much will depend on a change in policy by boards of directors and capital investment committees of major industrial companies. In recent months, reports Mr. Fairbank, these policy-making groups have been deferring for approval equipment previously approved by plant managements and purchasing agents. Relaxation of this "let's wait and see" attitude should result in a flood of orders for all types of material handling equipment, he says.

Construction

CONSTRUCTION activity in 1957 smashed dollar volume records for the 12th straight year in reaching a total of more than $65 billion, according to The Associated General Contractors of America. The Association foresees a potential market of up to $68 billion for 1958 as a result of rising highway construction and a recovery in residential building.

The 1957 total consisted of $47.2 billion in new construction

PUSH - THEY'RE ASSEMBLED !

--without threading, notching or drilling for cotter pins

PUSHNUT® FASTENERS

Type CK open end

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These low-cost, decorative, tempered spring steel nuts quickly push on unthreaded rod or rivets. A specially designed locking grip at the base exerts great resistance to removal. Available for .120", 5/32", 3/16", 1/4" and 5/16" unthreaded rod, in various finishes.

Cost Saving. PUSHNUTS are very low in cost. They reduce the cost of other parts by eliminating threading, notching, cotter pins, etc. Easy, speedy application reduces your assembly time and costs.

Grip Tight. Withstand forces from 40 to 240 lbs. according to size used, assuring reliable holding power.

Smart Appearance. Smooth contour of the Acorn Type C fully covers ends of rods. Type CK (open end) assembles with rod end flush with top of PUSHNUT.

Look over your assemblies. Where can you use PUSHNUTS? Send for free samples and literature.

THE PALNUT COMPANY, 60 Glen Road, Mountainside, N. J.

Detroit Office and warehouse:
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High Speed Assembly

The magnetic socket shown above provides easy, fast assembly, either manually or with an air hammer. Simple arbor presses can be used for bench assembly.

PALNUT® LOCK NUTS FASTENERS

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Quick, secure fastening at low cost

BLOOD BROTHERS SERVES INDUSTRY

WITH UNIVERSAL JOINTS AND ASSEMBLIES FOR ALMOST ANY PRODUCT APPLICATION

SIZES AND TYPES FOR HEAVY-DUTY AUTOMOTIVE, CONSTRUCTION AND ROAD BUILDING MACHINES, FARM IMPLEMENTS, TRACTORS AND INDUSTRIAL MACHINERY.

SAVE ENGINEERING TIME!

Here at Blood Brothers you can select from a wide, wide range of universal joints and complete drive assemblies. Torque capacities range from 350 to 500,000 inch lbs. — lengths from very close-coupled industrial joints to assemblies 120" overall.

You can be confident they are produced in a modern, centrally located plant, tooled for precision manufacturing. And you can rely on their high reputation for dependability.

When you specify Blood Brothers, you can save valuable engineering time by stating your problem to our service-minded engineers. They're cooperative, friendly and long-experienced. Just write or call.

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and for your convenience in specifying, request our free Blank Form "Specification Sheets".

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For Earthmoving Machines . . .

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can supply them!

GEARS to match the ever-increasing size and power of modern machines are a Fairfield specialty. This is possible because Fairfield has long been a leader in utilizing the most advanced methods, machines, and techniques for producing better gears. By keeping apace with modern engineering trends, Fairfield renders an invaluable service to many of America's machinery builders, both large and small.

At Fairfield, you get the benefits of high production rates and big volume output in an ultra-modern plant designed exclusively for producing fine gears EFFICIENTLY, ECONOMICALLY. Check with Fairfield NOW on your gear requirements. *Call or write.* FAIRFIELD MANUFACTURING CO., 2303 S. Concord Rd., Lafayette, Indiana. Telephone 2-7353.

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MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS

and about $18 billion in maintenance and repairs. It represents an increase of three per cent over the $63.1 billion total for 1956.

Construction volume in 1957 was featured by new peaks in private industrial and public utility facilities, stabilized commercial construction at a high level, a strong volume of state and local public works, and a continued decline in private residential activity, which showed indications of a recovery by the end of the year.

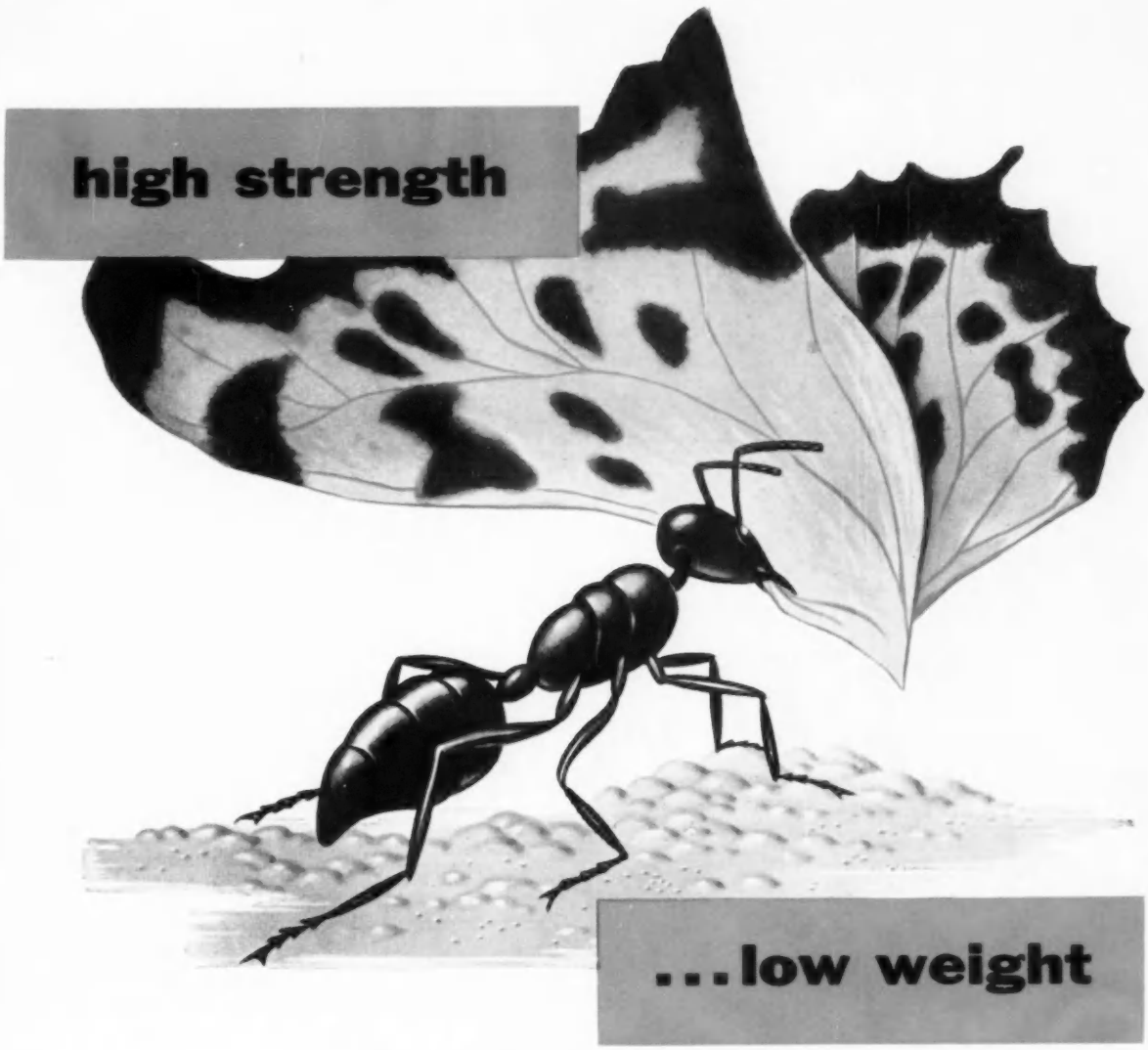
Industrial building reached $3.2 billion, about three per cent above 1956, but a decline was noted toward the end of the year as many of the large projects which had been under way reached completion. Highway construction increased eight per cent to $4.8 billion as states readied themselves for a steadily rising volume of work under the new highway program.

The Association divides its estimate of a potential 1958 volume of $68 billion into $49 billion for new construction and $19 billion for maintenance and repair operations. The total is based on the following assumptions;

1) Plant and equipment outlays will not drop more than 10 per cent
2) Any business decline will be short and mild
3) Credit conditions will improve
4) Constructions costs will stabilize and rise more slowly
5) Materials will be plentiful
6) There will be no prolonged work stoppages
7) There will be no curtailment of Federal construction programs
8) Worsening international conditions will not affect U. S. construction

AGC estimates that capital outlays by business in 1958 will slide from the all-time peak of over $37 billion in 1957 to about $35 billion in 1958. Major business categories of construction may total slightly under $12.5 billion.

The capital outlay decline is expected to be reflected mostly in a decrease of 9 to 10 per cent in industrial construction, centered



Of all working insects, the ant is stronger per unit of weight. And Parish Pressed Steel Division of Dana Corporation, a leading manufacturer of automotive chassis and frames, uses A. W. Dynalloy steel for the same reason . . . high strength—low weight.

There are other reasons, of course. A. W. Dynalloy is

. . . easy to weld
. . . easy to form
. . . resistant to corrosion

As with Parish Pressed Steel, A. W. Dynalloy can help you get more value per dollar spent for your product. Send for our A. W. Dynalloy booklet which gives complete information. Write Marketing Division, Dept. DY-E90.

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principally in manufacturing companies, for a total of about $2.9 billion. This may be offset by a $6 billion volume in public utilities.

Commercial construction may see a decline in large shopping centers. It should, however, be stabilized at a total of $3.6 billion by increasing construction of office buildings and warehouses.

The high levels of activity in the minor private non-residential categories of churches, educational, social, and recreational facilities are expected to be maintained. A moderate increase is anticipated for hospital and institutional building, and an eight per cent increase in public construction to more than $15 billion is expected.

Automotive Forecast for 1958

(*Continued from page* 49)

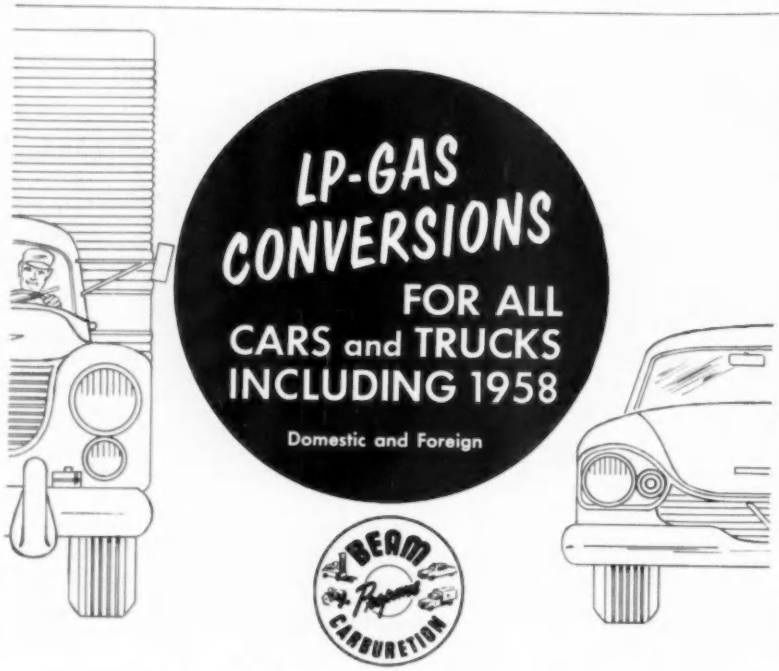
discontinue production of the two cars and concentrate on its fast-selling Rambler. Rambler took such good hold during 1957 that by October, AMC was able to close its bottle of red ink—in use since the merger of Nash-Kelvinator Corp. and Hudson Motor Car Co.—and dip its bookkeeping pen in the black inkwell.

Rambler sales for the year totaled approximately 98,000 units, surpassing the previous record of 73,807 set in 1955 and far ahead of the 1956 total of 71,330. George Romney, AMC president, hopes his company will sell 180,000 Ramblers during 1958; as the year ended, production of 1958 models was running some six weeks behind dealers' orders, and output was being raised toward 800 units a day.

The year 1957 was also a good one for Chrysler Corp. In fact, Chrysler, with its radically different 1957 models, was able to pull its sales up by a healthy margin to some 1,130,000 units, third best in corporation history. Market penetration rose some five percentage points. Production, despite a sharp cutback just before Christmas, totaled some 1,230,000 cars. Earnings amounted to $130 million, or better than $15 a share.

But the real test for Chrysler lies ahead. The corporation gambled heavily on its 1957 line in the realization that there would be little styling change for another two years. Now the question is whether the "dart-shape" cars will be able to carry on through 1958 and 1959 without losing any real ground in sales.

Chrysler's competition is stronger in 1958. General Motors suffered a decline in 1957, particularly in its middle-priced cars. Now, GM is back with a highly competitive line-up for 1958, and already the pattern has shown signs of changing. In fact, during the final two months of 1957, GM's market share rose above 50 per cent. In the first



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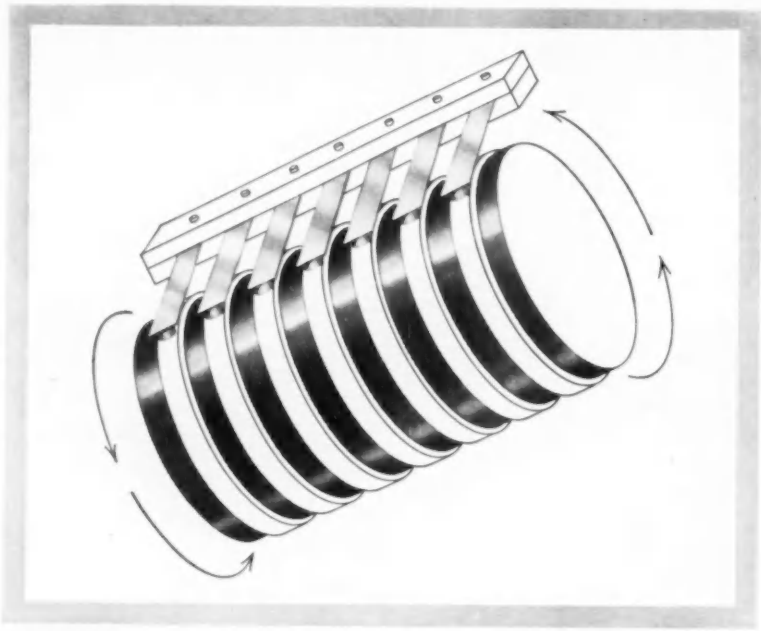
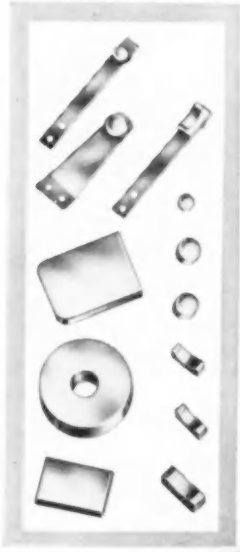


Minimizing SLIP-RING CONTACT R-F Noise Levels



Wherever contacts slide or operate against rotating surfaces, there is a good chance that specially developed Stackpole silver-graphite grades will assure good performance with a marked reduction in r-f interference levels.

They have, for instance, been used with outstanding success on applications ranging from radar antenna operating units to calculating machines; from aircraft prop-pitch rotators and de-icers to midget motors; for temperature measurements and on rotating equipment, and in many other uses.

They have assured more stable contact resistance and increased contact life. Equally important, Stackpole's unique high-temperature process for brazing these little contacts to their support arms has greatly simplified assembly operations. Overall costs have been reduced accordingly. Shielding and filters have proved unnecessary in many cases.

The usual method is to operate a silver-graphite contact against a coin-silver slip ring. In some cases, silver-graphite or copper-graphite operating against copper give satisfactory results. It all depends on the application—and that's where Stackpole's years of specialized experience in custom engineering contact material combinations from metal powders pays worth while dividends to contact users.

Details of your slip-ring contact (or brush) application will bring prompt recommendation based on a careful study of the equipment requirements and operating conditions.

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10 months, the percentage was around 45 per cent.

Ford Motor Co. led by Ford passenger cars, likewise had a successful year in 1957. Ford Div. took over the hotly contested lead in registrations from Chevrolet, and final sales for the year totaled approximately 1.5 million cars.

The Lincoln and Mercury divisions were united in September into a single operating division after somewhat disappointing model years for both cars. The merger eventually will effect economies in administration, advertising, sales and field forces.

Lincoln redesigned its cars for 1958, and production had begun on the new models at a new factory prior to the combination of Lincoln and Mercury. Early sales of the '58 Lincoln and Continental Mark II, which is akin to the Lincoln in style and price, were encouraging. Lincoln, incidentally, tooled its new factory to build the 1958 model with unitized construction. The Ford Thunderbird for 1958 also is being built at the Lincoln plant with unitized construction.

Another significant product advance in 1957 was air suspension. It first appeared in the spring as standard equipment on Cadillac's limited production Eldorado Brougham. General Motors and Ford Motor Co. announced air suspension as optional equipment for all models with the introduction of their 1958 car lines. American Motors announced that rear air suspension would be available on some models later this year. Only Studebaker-Packard and Chrysler Corp. remain without air suspension, although the latter is expected to offer a rear system sometime this year.

Air suspension, however, was slow in getting started. By the end of the year, Ford's three divisions had produced mainly pilot models and GM divisions had built only a handful of cars equipped with air suspension systems for several weeks after new model announcement.

Universal acceptance came in 1957 for the dual headlamp sys-

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Large and small plants in many industries are making important maintenance savings while actually boosting machine output—with Alemite Oil-Mist Automatic Lubrication.

The Oil-Mist system atomizes oil into air-borne particles, carries them through tubing to all lubrication points and bathes every moving surface with a cool film of clean lubricant while machines operate. It provides constant, uniform, completely automatic lubrication to a few or to hundreds of bearings. Accurate and foolproof, Oil-Mist eliminates guesswork. No bearing can be overlooked or over-lubricated.

Three types of Oil-Mist fittings apply lubricant in the form required. Either a mist fitting or a condensing fitting or a spray fitting, is used to lubricate any lubrication point.

An Oil-Mist system can be applied to any new or installed machine. Find out in detail how it cuts costs, reduces man-hours and machine downtime, extends bearing life, and increases production.

Write Alemite, Dept. U-18, 1850 Diversey Parkway, Chicago 14, Illinois.

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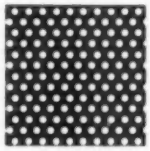
H&K PERFORATED MATERIALS

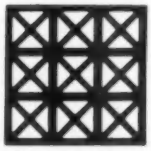
for Industrial or Decorative Uses

THOUSANDS OF DIFFERENT PATTERNS AVAILABLE



Round holes

Oblong holes

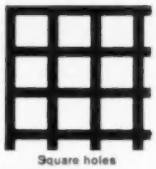


Decorative patterns

H & K facilities enable the perforating of all metals, wood, plastics and cloth fabrics. Perforated materials can be furnished in sheets, coils, rolls or plates. Fabricating services include shearing, rolling, welding and forming.

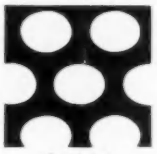
Perforated metal can be ordered with special finishes: aluminum—color anodized or brushed and lacquer finish; steel—painted, chrome plated, enameled, japanned or other baked-on finish. Decorative patterns can be embossed if requested.

Many patterns in steel sheets (industrial or decorative) are in stock at our warehouses. Send for H & K Stock List Brochure.



Square holes

Slots



Oval holes

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tem, tried by several makes in 1956. Fins, despite (or because of) the good-natured lampooning on the nation's comic pages, gained a further foothold with the introduction of 1958 models.

Perhaps the most important development detected during 1957 was the "small car trend," as it was popularly called. Just how strong the trend (if it is one) may be, or how far it will go, cannot be predicted with much authority at this time.

But the following facts regarding small cars are worth mention. General Motors decided in 1957 to import two of its European small cars—Opel and Vauxhall—to be sold in this country through the Buick and Pontiac divisions, respectively. Rambler sales increased, and AMC decided to revive its 100-in. wheelbase model dropped after 1955. The low-priced Studebaker-Packard Scotsman met with a favorable reception. Chrysler sent study teams abroad to determine small car possibilities.

(*Turn to page* 162, *please*)

Quantity
PRODUCTION
of
GREY IRON CASTINGS

ONE OF THE NATION'S LARGEST AND MOST MODERN PRODUCTION FOUNDRIES

ESTABLISHED 1866
THE WHELAND COMPANY
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$10.00 Trial Offer No. 1: eight ⅛", ten ¼", eight ⅜", ten ½" NPT pipe thread Tru-Seal Fittings.

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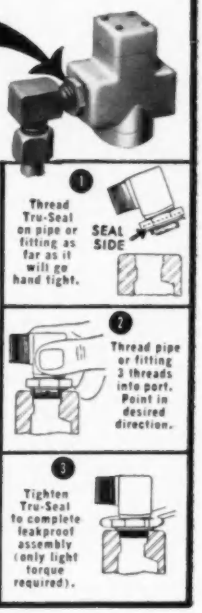
1
Thread Tru-Seal on pipe or fitting as far as it will go hand tight.
SEAL SIDE
2
Thread pipe or fitting 3 threads into port. Point in desired direction.
3
Tighten Tru-Seal to complete leakproof assembly (only light torque required).

A famous name in rubber and steel—
now a colorful new name in aluminum!

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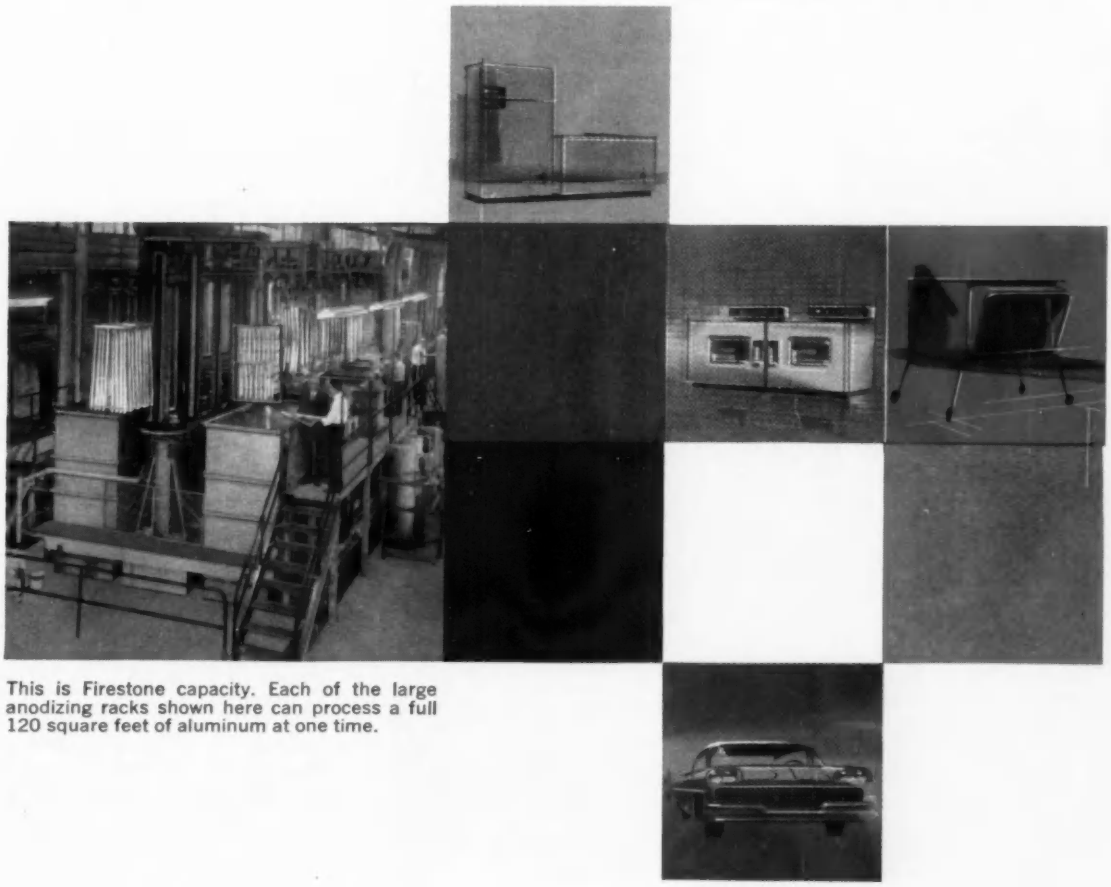
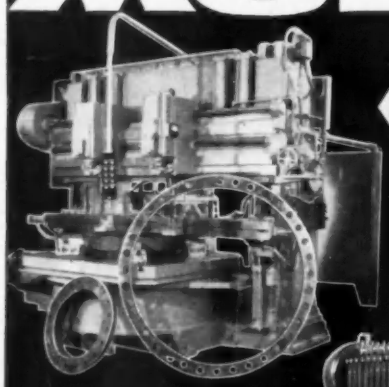
Already producing! The industry's newest, most completely automated fabricating and anodizing facility! Firestone, long a leader in supplying steel parts and trim, now offers color-bright Fashionized aluminum. Aluminum shaped, textured and color-anodized for automobile and appliance brightwork. Aluminum tailored and tinted to the most exacting specifications. Aluminum mass-produced in sizes up to seven feet long. Aluminum delivered at new competitive schedules and costs that let you make the widest use of color trim. Firestone invites your inquiries—invites you to see its fashionizing facility, one of the largest in the world.

FIRESTONE STEEL PRODUCTS COMPANY, AKRON 1, OHIO

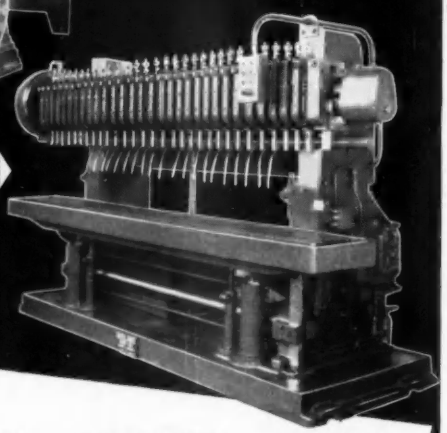


This is Firestone capacity. Each of the large anodizing racks shown here can process a full 120 square feet of aluminum at one time.

MOLINE



HD68 drills bolt circles from 12" to 100" diameter. Each of the two spindles has capacity for 2½" drill in steel. Operating cycle is fully automatic.



HD13 straight line-type drilling machine with capacity for thirty ¾" drills in steel. Used for work on heavy castings, round and rectangular steel tubes, structural shapes, plates and grader blade drilling or countersinking.

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Use an individually designed "Hole-Hog" Machine Tool for such jobs as...

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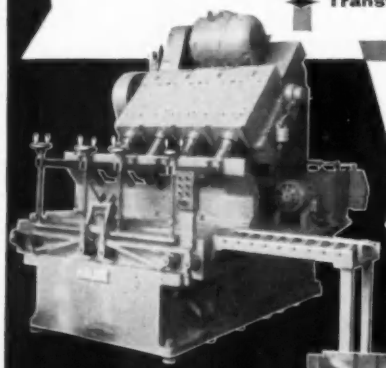

13CB hydraulic feed cylinder boring machine. V-8 engine blocks are rough and finish bored for wet-type cylinder sleeves. Units of this kind are applicable for transfer machines.

MR152 performs drilling, reaming, spot facing and chamfering operations on tractor rear axle housings. A companion machine, MR151, does tapping in addition to the foregoing operations. Work holding fixtures are mounted on power driven trunnion.

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109

SHORTIES

Partly because electricity produced from nuclear power will be cheap by 1965, electric furnaces will gradually replace open hearth furnaces. In addition, furnaces of the future will be largely automatic, will permit high-speed analysis, and will be fully instrumented for all functions.

●

Titanium metal production in 1948 was about three tons. In 1957, from 10,000 to 28,000 tons of titanium in the form of mill products were consumed.

●

An aircraft engine fuels laboratory has the capacity to pump every hour enough fuel to empty 35 railroad tank cars.

●

Deviation of 0.005 in. of thickness in a wing skin could add 275 lb of extra weight to a jet bomber.

●

Aircraft engineers predict that inhabited space craft will fly at speeds up to 80,000 mph and will take from several months to several years to complete round trips to nearby planets.

●

In the United Kingdom, the world's second largest gasoline consuming country, the duty on gasoline comes to about 30 cents per gallon. Duties and taxes in Belgium are 29.8 cents a gallon; West Germany, 27.5; Switzerland, 22.0; Netherlands, 25.6; and Brazil, 22.4.

●

One of every five vehicles checked during the 1957 National Vehicle Safety-Check program was found to need maintenance attention for safe driving.

●

The nation's public and private debt (net) rose $28 billion in 1956 to reach $684 billion, or the equivalent of $12,979 for every American family.

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Tinnerman can help you find a cost-cutting, product-improving solution to your fastening problems. A few of the most widely used standard types are shown, yet there are over 8000 variations of SPEED NUT brand fasteners to help cut assembly costs, parts cost and materials handling. And Tinnerman engineers average 4 new one-piece multiple-function, spring steel SPEED NUTS every day to fill special fastening jobs. See your Tinnerman representative, and write for our case-history booklet, "SPEED NUT Savings Stories".

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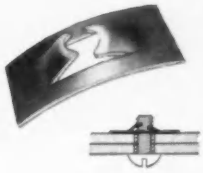
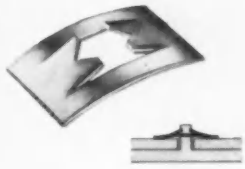


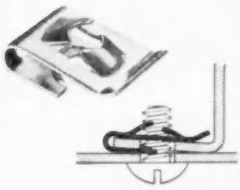
FLAT TYPE

One-piece self-locking spring steel fasteners. Replace threaded nuts, lock washers or spanner washers. Available in a wide variety of shapes and screw sizes.



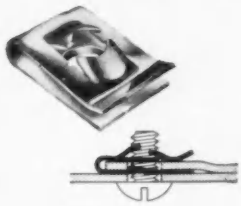
PUSH-ON

Zip over unthreaded die cast or plastic studs, rivets, nails, tubing, or wire to lock parts securely. Removable types available in many sizes.



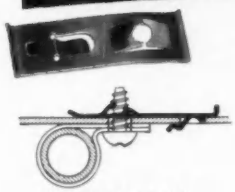
"J" TYPE

Snap over edge of panels and into center hole locations. Hold themselves in place for blind assembly. Full range of panel thicknesses and screw sizes available.



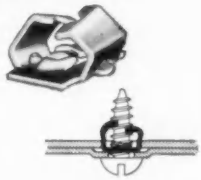
"U" TYPE

Perform same function as "J" type for reduced materials handling. Used where full bearing on lower leg of the SPEED NUT is required.



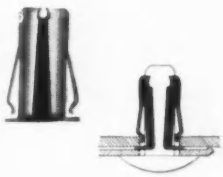
LATCH TYPE

Easily applied by hand, are self-retained in bolt-receiving position at center panel locations for blind attachments. Front mounting types are also available.



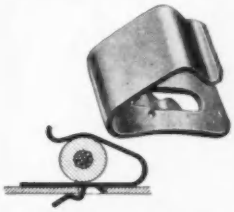
EXPANSION TYPE

For lightning-fast attachments in blind locations. Snap into mounting holes by hand. Screw spreads spring fingers, wedge-locks part in position. Secure, vibration-proof attachment.



TUBULAR CLIPS

For use with unthreaded studs or rivets. Virtually "nails" panels together where there is access to one side only. Permanent lock or removable types.

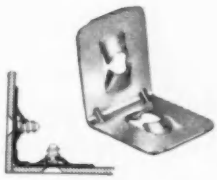


CABLE, WIRE, AND TUBE RETAINERS

Snap in place by hand, self-retained in position to receive wide range of cable, wire and tube sizes. Easily removed for service or re-location.

HARNESS CLAMPS

Open or close by hand — no tools needed. Attach to panel or pre-assemble to harness before installation. Cushioned to protect wires. Cannot open accidentally.

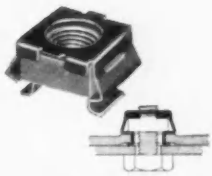


ANGLE BRACKETS

Combine bracket and fastener to reduce number of parts, speed up assembly and strengthen the structure. Variety of shapes and sizes.

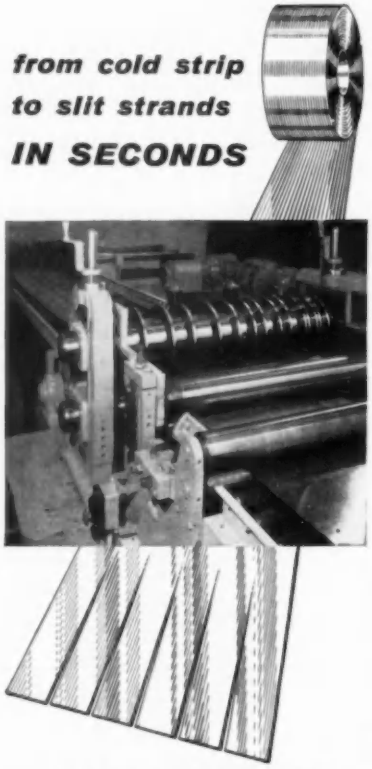
HOSE CLAMPS

Self-locking, ratchet-type design, one-piece low profile construction — no bolts, nuts or thumb screws. Fast and easy to apply and remove for medium- and low-pressure connections.



NUT RETAINERS

Retain square nuts in blind locations. No welding, clinching, staking — snap in by hand. Provided in a wide range of screw sizes. "U" and "J" type retainers available.



YODER ROTARY MULTIPLE SLITTERS

A Yoder slitter converts mill-width coils of flat-rolled metal into many variable-width strands in amazingly short time. Speed, coupled with great accuracy and low manpower requirements, makes a Yoder slitter an important factor in keeping production and overhead costs down.

Operated by only two men, the Yoder Type 3-48 slitter illustrated is designed to accommodate standard mill-width coils up to 48 inches wide, in a variety of metals and thicknesses. The slit strand widths can be held to within a .004" tolerance.

Even if your steel requirements are as little as 100 tons a month, the savings to be realized in time, manpower and raw material costs alone will pay for a Yoder slitter in the first few months of operation.

There is a Yoder slitter designed and engineered to meet your requirements, and to speed the delivery of "special" width stock in a wide range of large or small sizes. Send for your free copy of the fully-illustrated, 76-page booklet, "Multiple Rotary Slitting Lines."

THE YODER COMPANY
5553 Walworth Avenue • Cleveland 2, Ohio

ENGINEERING YODER MANUFACTURING ROTARY SLITTING LINES

(*Continued from page* 158)

Imports of small cars increased phenomenally during the year.

There was considerable building activity during 1957, both in new plants and in plant additions. The industry spent some $1.28 billion during the year, including nearly $700 million by GM, more than $400 million by Ford, and some $130 million by Chrysler.

Chevrolet began work on an aluminum foundry at Massena, N. Y., and GM's Euclid Div. began construction of a new plant at Hudson, O. Cadillac began stamping operations in a former Hudson Motor Car Co. plant in Detroit.

Chrysler began passenger car production at Newark, Del., broke ground for a new Plymouth assembly plant near St. Louis, and began operations at a new stamping plant at Twinsburg, O. Mercury opened a new plant at Los Angeles, and Lincoln began building cars at its new plant at Wixom, Mich. Numerous smaller expansion and modernization programs of various sizes were begun or carried out. Capital expansion during 1958 probably will amount to less than $1 billion, with work mainly on current projects.

• • •

New GM Plant Construction Going Ahead on Schedule

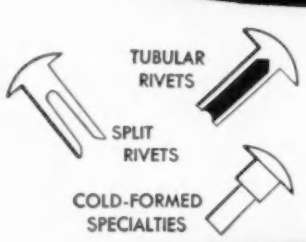
Construction of GM Euclid Div.'s new plant at Hudson, O. is approximately 40 per cent complete and moving on schedule toward a July, 1958 target. Steelwork (approximately 6300 tons) is up, and enclosure of the 650,000 sq ft plant is expected to be completed by next February.

Eventually, all Euclid crawler tractor production will be transferred to the Hudson plant. First plans call for Hudson production of two Euclid crawler tractors — TC-12 and C-6 — and other crawlers under development in Cleveland.

Ground was broken at Hudson last March. Further expansion plans calls for additional manufacturing facilities, a complete parts warehousing operation, and general offices. The two major plants of the division in Cleveland will continue full production.

COST-CUTTING PRODUCTION TEAM

MILFORD RIVETS and RIVETERS



Full or Semi-automatic
Bench or Floor Models
Single or Multiple Spindle

FIVE MANUFACTURING PLANTS GIVE UNMATCHED SERVICE

THE MILFORD RIVET & MACHINE CO.

MILFORD, CONNECTICUT • HATBORO, PENNSYLVANIA
ELYRIA, OHIO • AURORA, ILLINOIS • NORWALK, CALIF.

MONROE LOAD-LEVELERS

Calibrated Ride Control with Any Load

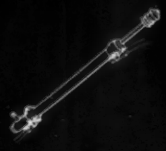
Safety
Comfort
Economy

MONROE

The Greatest name in Ride Control

MONRO-MATIC SHOCK ABSORBERS — Standard on more makes of cars than any other brand.

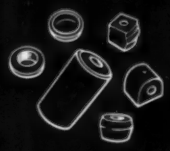
MONROE AIR-O-STEER Power steering for air-equipped trucks, buses. Installed in 2 hours.



DIRECT ACTION POWER STEERING — The only truly direct-action Power Steering units available.

MONROE SWAY BARS— Specified as standard equipment on 15 makes of passenger cars.

E-Z RIDE SEATS—Standard on more tractors than all other seats of this type combined.



MOLDED RUBBER PRODUCTS — Precision-built for all automotive and industrial applications.

MONROE AUTO EQUIPMENT COMPANY

Monroe, Michigan—World's Largest Maker of Ride Control Products

Sidewinder Control Fins

sidewinder...
a deadly new fang for Naval Jets!

The Navy's new self-guided, air-to-air missile, "Sidewinder," is so accurate that it can "home" in on and hit the tailpipe of a supersonic jet engaged in violent evasive action. Control fins for this deadly new missile are produced by the Aviation Divisions of Kelsey-Hayes Co., Detroit 32, Michigan.

KELSEY-HAYES

Automotive, Aviation and Agricultural Parts • Hand Tools for Industry and Home

17 PLANTS: Detroit and Jackson, Mich.; Los Angeles; McKeesport, Pa.; Springfield, Ohio (Speco Division); Utica, N. Y. (Utica Drop Forge & Tool Division); Davenport, Iowa (Farm Implement and Wheel Division); Philadelphia (Heintz Division); Windsor, Ontario, Canada.

Cushioned® Power IS SMOOTHER POWER

Continental TD-6427
Cushioned Power Diesel

TRANSPORTATION DIESEL ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
TD6427	6	4 5/16	4 1/8	427	116.0 @ 2400 RPM
RD6572	6	4 3/4	5 3/8	572	172.0 @ 2400 RPM
VD8603	8	4 3/4	4 1/4	603	182.0 @ 2800 RPM
SD6802	6	5 5/16	5 1/2	802	225.0 @ 2200 RPM

TRANSPORTATION GASOLINE ENGINES

Model	Cyl.	Bore	Stroke	Displ.	Bare Engine H.P.
N4062	4	2 1/8	3 1/2	62	26.3 @ 3500 RPM
Y4069	4	2 1/2	3 1/2	69	28.0 @ 3500 RPM
Y4091	4	2 7/8	3 1/2	91	36.0 @ 3400 RPM
F4124	4	3	4 1/8	124	47.0 @ 3200 RPM
F4140	4	3 3/16	4 1/8	140	52.0 @ 3200 RPM
F4162	4	3 7/16	4 1/8	162	58.0 @ 3200 RPM
F6186	6	3	4 1/8	186	77.0 @ 3500 RPM
F6209	6	3 3/16	4 1/8	209	90.0 @ 3500 RPM
F6226	6	3 5/16	4 1/8	226	98.8 @ 3500 RPM
F6244	6	3 7/16	4 1/8	244	105.0 @ 3750 RPM
M6271	6	3 1/2	4 1/8	271	96.5 @ 3000 RPM
M6290	6	3 1/4	4 1/8	290	108.0 @ 3000 RPM
M6330	6	4	4 1/8	330	125.0 @ 3000 RPM
M6363	6	4	4 11/16	363	146.0 @ 3000 RPM
B6371	6	4 1/8	4 5/8	371	123.5 @ 3000 RPM
B6427	6	4 5/16	4 1/8	427	142.0 @ 3000 RPM
K6271	6	3 5/8	4 1/8	271	114.5 @ 3200 RPM
K6290	6	3 1/4	4 1/8	290	123.0 @ 3200 RPM
K6330	6	4	4 1/8	330	147.0 @ 3200 RPM
K6363	6	4	4 11/16	363	162.0 @ 3200 RPM
T6371	6	4 1/8	4 5/8	371	143.8 @ 3000 RPM
T6427	6	4 5/16	4 1/8	427	170.0 @ 3000 RPM
U6501	6	4 1/2	5 1/4	501	178.0 @ 2600 RPM
R6513	6	4 1/2	5 1/8	513	192.2 @ 2800 RPM
R6572	6	4 3/4	5 3/8	572	220.0 @ 2800 RPM
R6602	6	4 1/8	5 1/8	602	232.0 @ 2800 RPM
S6749	6	5 1/8	5 1/2	749	250.0 @ 2800 RPM
S6820	6	5 1/8	5 1/2	820	275.0 @ 2800 RPM
V8603	8	4 3/4	4 1/4	603	240.0 @ 3200 RPM

A tip from fleet operators who have switched to Continental Diesel: When you're ready to "go Diesel," it pays, in more ways than just initial cost, to go the whole distance and get exclusive Red Seal Cushioned Power. In that way, you obtain fullest measure of ALL the advantages identified with engines of Diesel type. You use less fuel than with conventional Diesels. You have more cargo capacity because you're lugging less engine weight. And the wide interchangeability of parts between Cushioned Power Diesels and companion models in the Red Seal gasoline engine line expedites maintenance and sharply reduces parts cost.

•

AUTHORIZED SERVICE
and genuine Red Seal parts available from coast to coast.

CONTINENTAL MOTORS ® Powerful as the Nation AMERICA'S STANDARD

Continental Motors Corporation
MUSKEGON, MICHIGAN

WORLD'S LEADING INDEPENDENT MANUFACTURER OF INTERNAL COMBUSTION ENGINES, CONTINENTAL MOTORS OPERATES PLANTS IN ATLANTA, DALLAS, DETROIT, MILWAUKEE, MUSKEGON, AND TOLEDO, AND IN ST. THOMAS, ONT., PRODUCING AIR-COOLED AND LIQUID-COOLED ENGINES FOR USE ON LAND, AT SEA AND IN THE AIR.

MOLDED FIBER GLASS*

cuts tooling time 50%...
cuts tooling costs 80%...
makes automotive parts better!

*MOLDED FIBER GLASS is the exclusive trade name for fiberglass reinforced plastic products custom molded by the Molded Fiber Glass Body Company.

Every year, more and more automotive manufacturers are turning to tough MOLDED FIBER GLASS to spruce up designs . . . speed up styling changes . . . slash total costs. Because, from drawing board to production, MOLDED FIBER GLASS parts require only half the time, and tools cost only one-fifth as much as for metal parts. And if your production requirements are 25,000 or less . . . you'll save money by using MOLDED FIBER GLASS parts.

MOLDED FIBER GLASS can be molded into shapes which you can't make with metal. Complex, deep-draw parts can be molded in one piece . . . pigmented in any color, or painted.

Besides all this . . . MOLDED FIBER GLASS makes automotive parts *better*, because:

1. MOLDED FIBER GLASS combines high strength with light weight.
2. It's impact resistant . . . returns to original shape after heavy impact.
3. It won't rust or corrode . . . serves as an effective sound deadener . . . has a low rate of heat transfer.

Do you have an application for this remarkable material? Write today for detailed information.

GREATEST NAME IN REINFORCED PLASTICS — MOLDED FIBER GLASS

MOLDED FIBER GLASS BODY COMPANY

4611 BENEFIT AVENUE, ASHTABULA, OHIO

Help Satisfy the "Low Cost" Requirements of Your Design

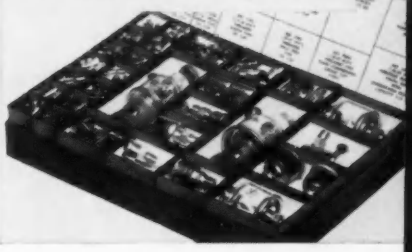
GITS

World's Largest Selection of

LUBRICATING DEVICES

LUBRIKIT... An assortment of 95 oil cups of 29 different types. Gits sales records show these oilers are most used for replacement and maintenance. Contents of each separate bin are clearly described on Inside Cover.

Special Introductory Price
Just **$14.95** F.O.B. Factory
Satisfaction or your money back

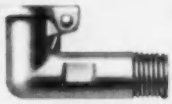


OIL HOLE COVERS

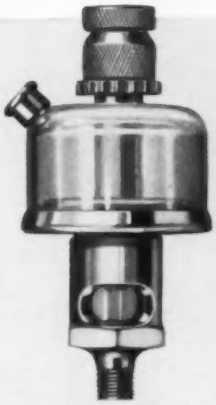
Style R — No. 304
Shoulder Drive

Style G — No. 505
Beaded Drive

Style GB — No. 527
Ball Valve



Style L — No. 1204
Brass Elbow (Threaded)



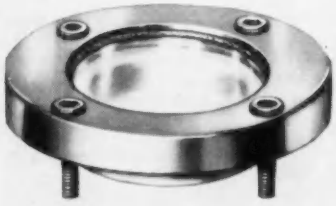
SIGHT GRAVITY FEED OILERS

Rate of oil flow regulated by needle valve, directly observed through sight glass in stem. Shut-off knob does not affect needle valve adjustment. Visible oil supply. Non-breakable. Tops in convenience and dependability, at low cost. Style NFU—No. 3602-A.

GEAR CASE GAUGES

This oil gauge plug permits instant checking of oil level within a transmission or gear case. For use where construction permits insertion in tapped hole. A valuable addition to any such equipment — at very low cost. Style BW—No. 4042.

GEAR CASE GAUGES



Screw mounted, to set flush. Glass port is backed with white enameled reflector, to make oil level (in gear case or transmission) readily visible, even in dim light. Style CW — No. 4032.

SIGHT GAUGES

For use where rate of oil flow must be regulated to suit changing operating conditions. Needle valve permits extremely accurate adjustment of oil feed. Sight glass provides direct observation of rate of oil flow. Accuracy and convenience at a moderate price. Style PF—No. 4290.

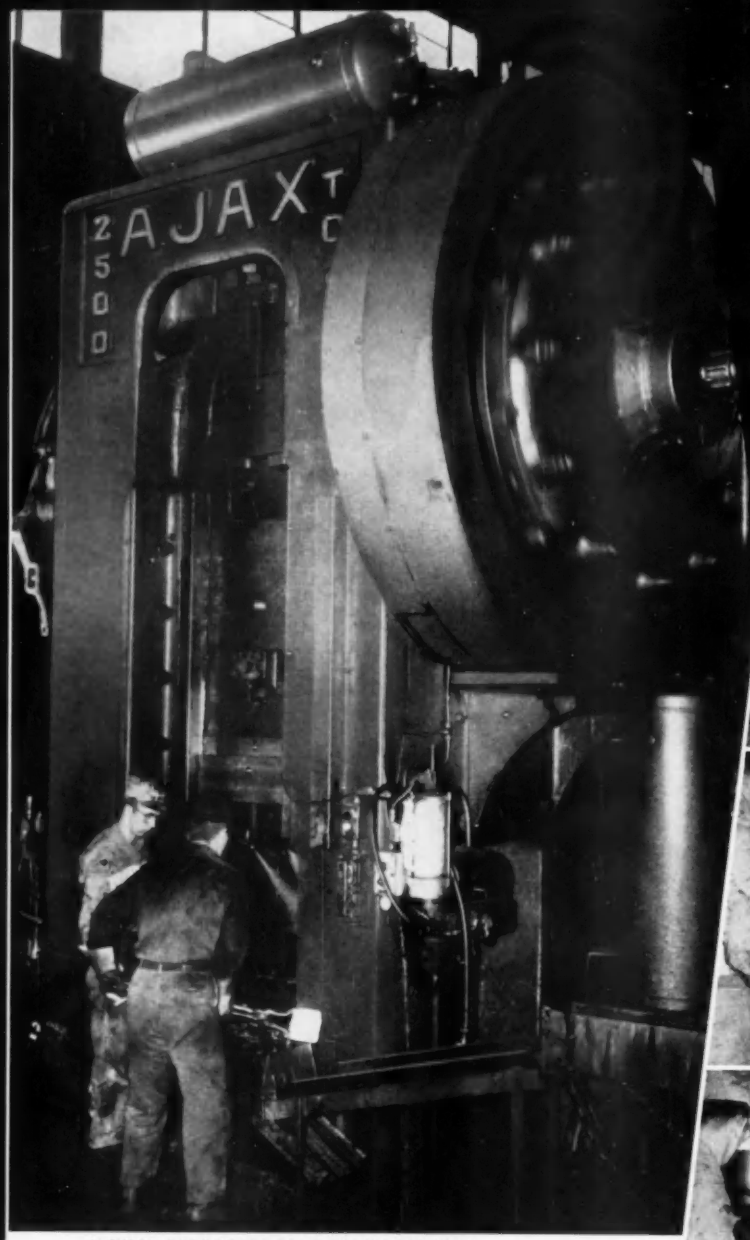
Don't price yourself out of the market. When you design proper lubrication into your equipment, specify GITS Lubricating Devices—the widest selection available anywhere. The items pictured above are only a few of our many thousands of lubricating devices. At the design stage, get the GITS story. Free Engineering Service. Send NOW for your free Catalog.

GITS BROS. MFG. CO.

The Standard For Industry For Almost Half A Century

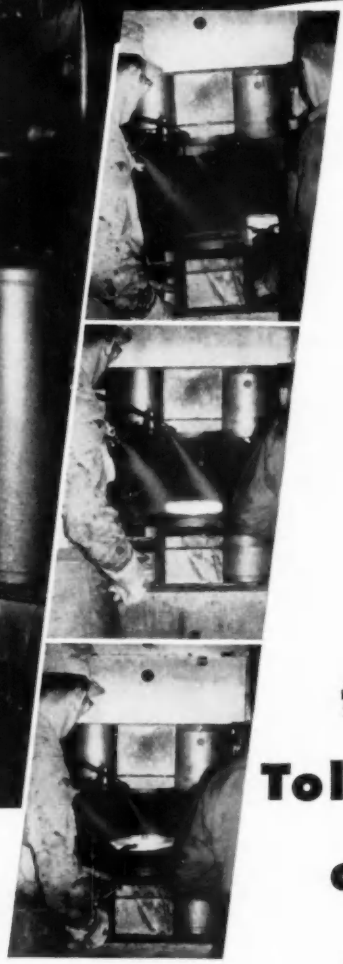
1870 South Kilbourn Avenue
Chicago 23, Illinois

Clip this page for handy "rough reference"



JACKSON DROP FORGE CO., JACKSON, MICHIGAN

ACCURATE PRESS FORGINGS REDUCE MACHINING COSTS



Progressive Multi-stage Forgings as shown above are Forged in one heat with less draft on AJAX Forging Presses. Machining is reduced to a minimum for a saving in both time and material.

Powerful AJAX Presses are fast operating and well-aligned—built with a solid steel frame in sizes 300 ton to 8000 ton capacity.

There is an AJAX Press to fit your particular Forging requirements . . .

Write for Bulletin 75C

Forged to Close Tolerances on AJAX Forging Presses

AJAX METAL WORKING MACHINES

FORGING PRESSES — FORGING MACHINES — FORGING ROLLS — AJAX-HOGUE WIRE DRAWERS

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For forty-eight years McQuay-Norris has helped automotive designers convert ideas into reality.

For ring design service that always measures up to your needs, call on us.

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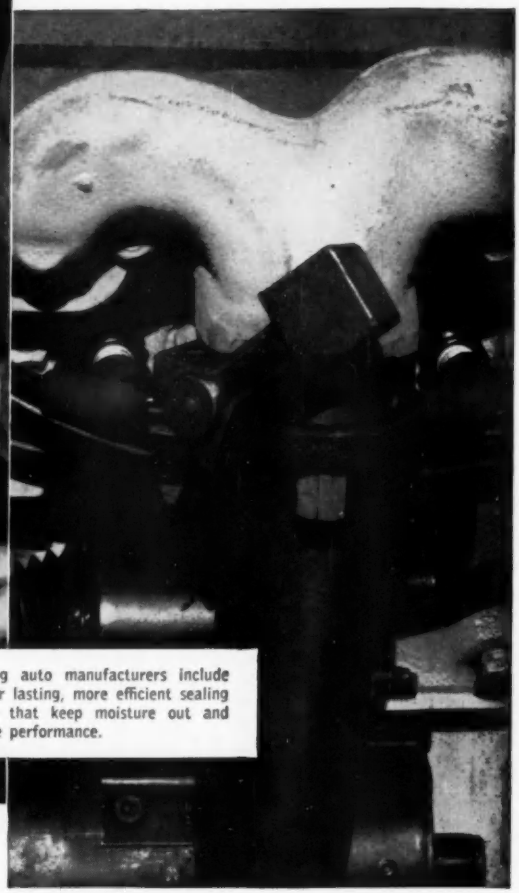
MANUFACTURING CO. **St. Louis • Toronto**

Largest Producer of Small Rings in the Automotive Industry



Typical Silastic applications by leading auto manufacturers include transmission oil seals that provide longer lasting, more efficient sealing against hot oil; and sparkplug covers that keep moisture out and withstand heat to produce better engine performance.

SILASTIC molded parts seal oil in, moisture out

SILICONE RUBBER

Molded parts of Silastic*, Dow Corning's silicone rubber, show little or no change in physical or dielectric properties after long exposure to temperature extremes which would quickly ruin organic rubber. Leading rubber companies fabricate Silastic molded parts in practically any color, size or shape.

Get latest data on Silastic

Mail coupon today

Dow Corning Corporation, Dept. 061
Midland, Michigan
Please send me latest data on Silastic

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COMPANY _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

*T.M.REG. U.S.PAT. OFF.

Typical Properties of Silastic for Molded Parts

• Temperature Range, °F	—130 to 500
• Tensile strength, psi	600 to 900
• Elongation, %	150 to 300
• Compression set, %, @ 300 F	15 to 40
• Hardness range, durometer	20 to 90
• Dielectric strength, volts/mil	400 to 500
• Oil resistance	Dependent on type of oil

If you consider ALL the properties of a silicone rubber, you'll specify SILASTIC.

first in silicones — DOW CORNING SILICONES

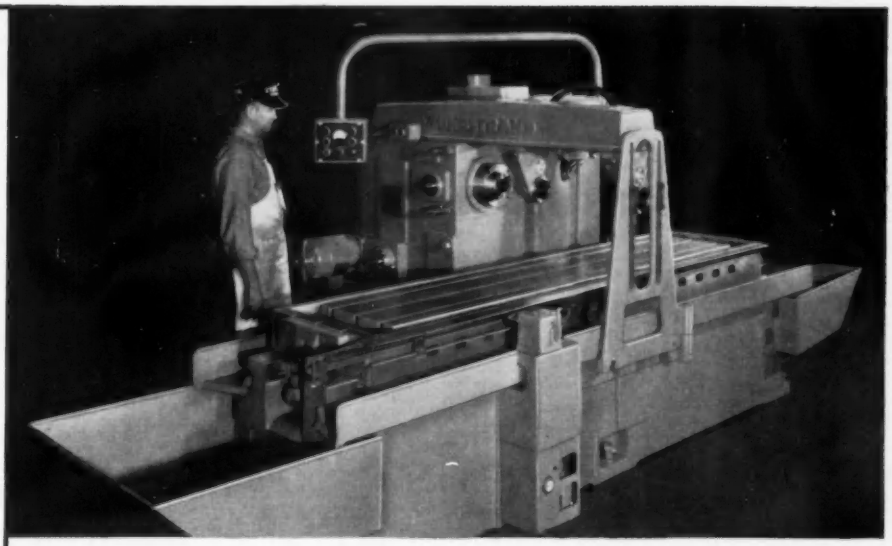
DOW CORNING CORPORATION • MIDLAND, MICHIGAN

New SUNDSTRAND C-MODEL RIGIDMILS COVER A WIDE RANGE OF JOBS

CHECK THIS COMBINATION OF NEW AND PRODUCTION-PROVED FEATURES

- ☐ Unit construction of head, table, and column permits maximum interchangeability through several machine sizes.
- ☐ 100 to 1 ratio between high and low feed rate in mechanical drive for table feed screw. Standard feed ranges available are: ¾" to 75" or 1½" to 150" per minute.
- ☐ Climb or conventional milling can be performed separately or in combination.
- ☐ Screw feed to table.
- ☐ Square type table ways surfaced with wear resistant, nonscoring material.
- ☐ Automatic lubrication to all moving parts.
- ☐ Unusually heavy spindle with precision type bearings.
- ☐ Automatic table cycles for maximum efficiency.
- ☐ Chips can be removed easily from the sheet metal chip pans at each end of machine.
- ☐ Adjustable dwell mechanism for one or both ends of table.
- ☐ Ball bearing screws can be provided for numerically controlled or electronic tracer controlled machines.*
- ☐ Second table feed rate for one or both ends.*
- ☐ Vertical power movement to head.*
- ☐ Vertical feed and rapid traverse to head.*
- ☐ Chip paddles for removal of chips to chip pan.*

* *Optional at extra cost.*



Now — for the first time — the new Sundstrand "C" Model Rigidmils let you choose the milling machine with the right combination of table size, stroke, spindle speeds, horsepower, etc. for your job. Unit construction permits interchangeability of heads, tables, and columns through several sizes and provides customized installations where needed.

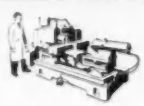
Every Sundstrand Rigidmil, both Simplex and Duplex, can be set up quickly and easily for a wide range of work. Pushbuttons are used to control single job setups and dogs on the front of the machine automatically control a wide range of production milling cycles.

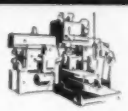
Write for Bulletin 287 describing C-Model Rigidmils

SUNDSTRAND
Machine Tool Co.
2571 Eleventh St. • Rockford, Ill., U. S. A.

SUNDSTRAND "Engineered Production" Service"

AUTOMATIC LATHES | SIMPLEX RIGIDMILS | DUPLEX RIGIDMILS | TRIPLEX RIGIDMILS | SPECIAL MACHINES





If you have a carburetor problem for any type of engine, no matter what size, horsepower or design . . . we either have built, or have the skills to build a reliable carburetor which will meet exactly all your specialized requirements at an economical cost. Your best assurances of outstanding performance are our important and diversified contributions in every phase of carburetor research and development. **Zenith* actually has more experience in more fields with more engine types than any other carburetor manufacturer.**

*REG. U.S. PAT. OFF.

Zenith Carburetor Division

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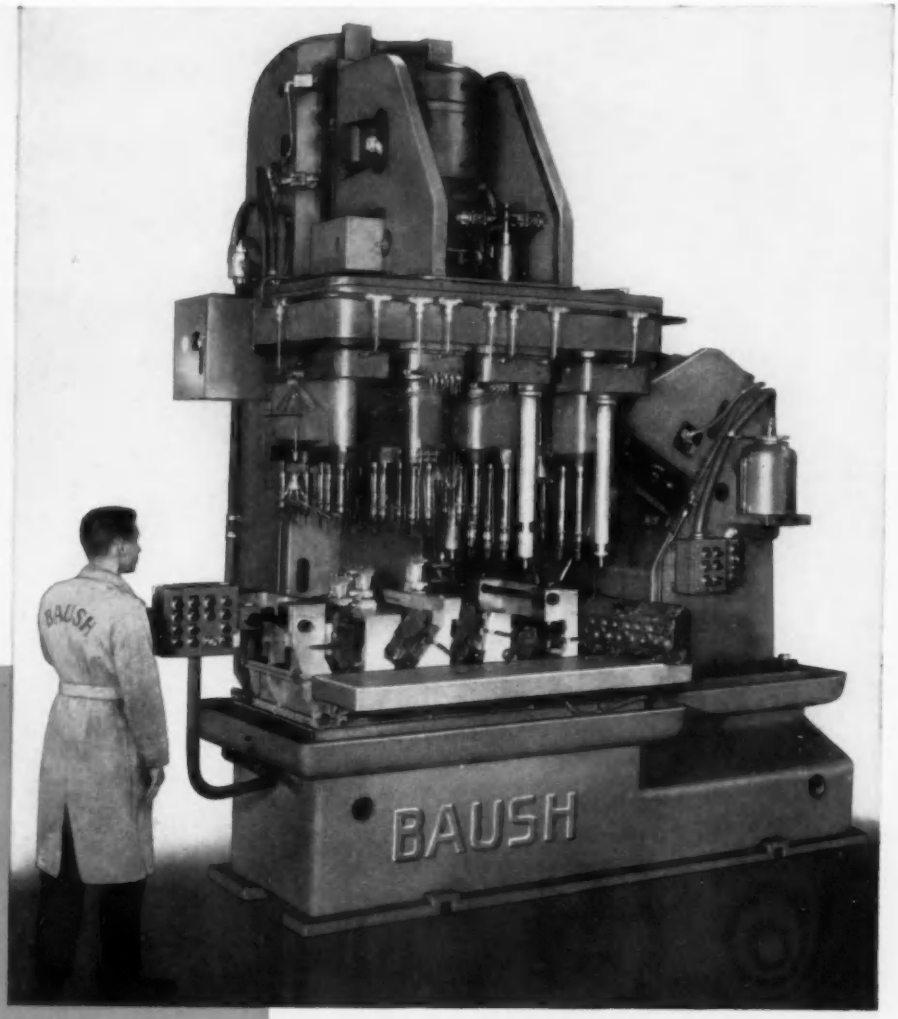
Export Sales: Bendix International, 205 E. 42nd St., New York 17, N. Y.

Bendix
AVIATION CORPORATION

BAUSH

2 - WAY INDIVIDUAL LEADSCREW SPINDLE TAPPING MACHINE



with

HYDRAULICALLY OPERATED VERTICAL COLUMN UNIT HAVING A 37 SPINDLE HEAD

BAUSH
MACHINE TOOL CO.
SPRINGFIELD 7, MASSACHUSETTS

One of several units that round out a production line for finshing cylinder heads in a leading automotive plant.

Designed specifically for tapping spark plug holes at exact angles, this unit completes 37 operations at five stations.

Another NEW and interesting machine developed by BAUSH. Send us your production problems—we can do as much for your production lines.

SPECIFICATIONS:

A BAUSH W-7 vertical column is mounted on a heavily constructed welded steel base equipped with chip trough and coolant tank. The 37-Spindle Head is of pot-type construction, and in addition there is a single spindle stationary type Angular Tapping Head. The permanent fixture has 5 stations hydraulically operated and electrically interlocked. Hydraulic Pump has an 18" stroke cylinder. Trabon lubrication is used in unit and mist lubrication is used in tapping.

OPERATION:

Tapping spark plug holes in cylinder head.

OSBORN

BEFORE BRUSHING

AFTER BRUSHING

Centerless Brushing Method

quickly produces precision finish

Osborn Matic® Brush puts final finish on aluminum pistons.

WHEN it comes to precision finishing of cylindrical parts, Osborn's Centerless Brushing method does the job quickly and efficiently.

The aluminum pistons shown above are fed across the face of an Osborn Matic® Bufcut® Brush mounted on a standard centerless grinder. Feather burrs are thoroughly removed, surface junctures blended, and surface finish refined . . . automatically and economically.

A wide range of cylindrical parts can be processed in a similar manner.

An **O**sborn **B**rushing **A**nalysis, made in your plant at no obligation, will demonstrate how Osborn Power Brushing Methods can help automate your operations...improve your product. *The Osborn Manufacturing Company, Dept. E-60, Cleveland 14, Ohio.*

Write Today for the new 100-page Osborn Catalog 210-C.

Osborn Brushes

BRUSHING MACHINES • BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES • FOUNDRY PRODUCTION MACHINERY

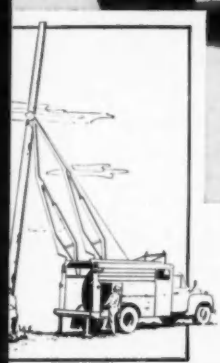
SHELBY SEAMLESS TUBING helps "Pole-Master"* handle poles like matchsticks

THE POWERFUL, two-legged boom of this "Pole-Master" Hydraulic Derrick is made of cold drawn tubes of USS Shelby Seamless Mechanical Tubing. Capable of handling poles up to 75 feet in length with relative ease, the boom is activated by two hydraulic cylinders, also of Shelby Seamless, which are powered by a heavy-duty hydraulic pump. The derrick has an operating arc of more than 180 degrees, and is designed to "set" poles or "pull" them from the ground. The "Pole-Master" can be used under the most severe work conditions in any weather or climate.

Here is an application in which Shelby Seamless Tubing really excels, for it brings into play all the desirable qualities that Shelby Seamless possesses—high strength, uniformity, shock absorbency, dimensional accuracy, lightness and workability.

Produced to exacting standards by the world's largest manufacturer of tubular steel products, Shelby Seamless is available in a wide range of diameters, wall thicknesses, various shapes and steel analyses. You are invited to call on our engineers for assistance. They will be happy to submit recommendations based on a study of your particular requirements.

**Manufacturer's name on request.*



WALLS WITHOUT WELDS

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
(Tubing Specialties)

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

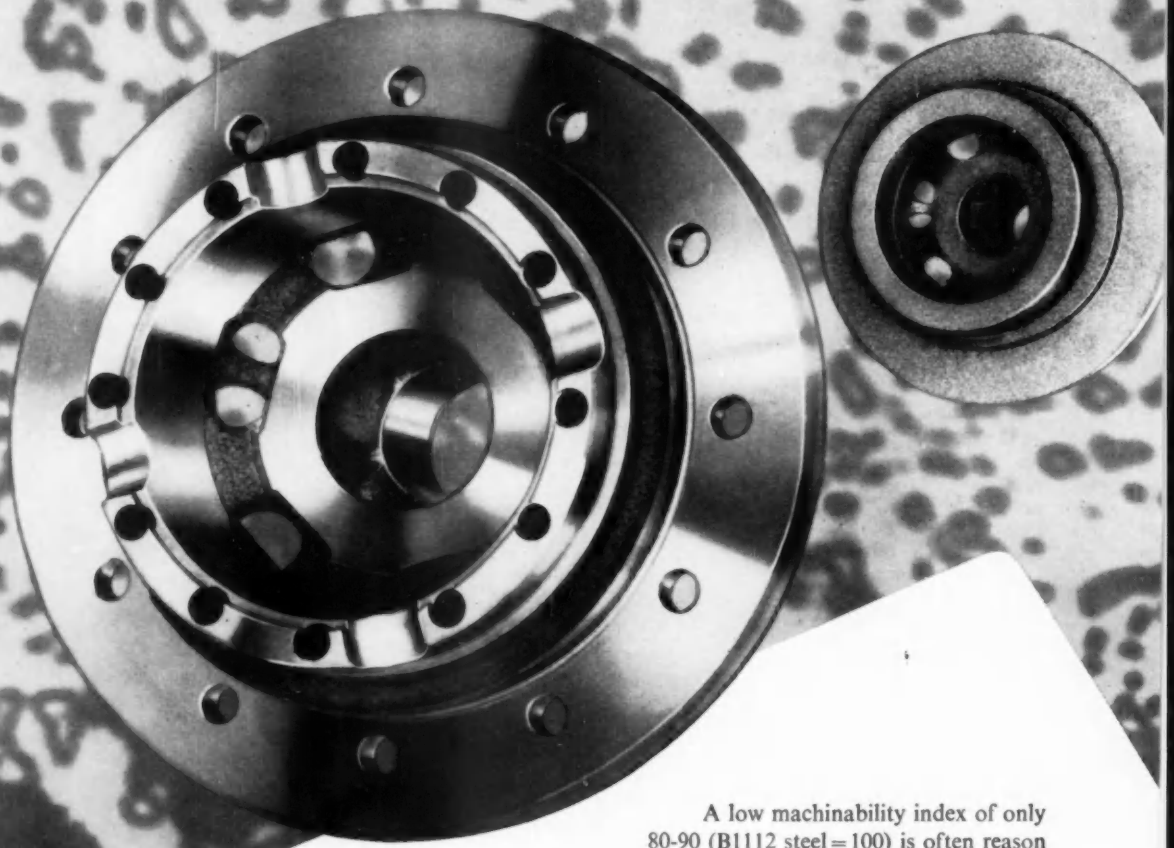
SHELBY SEAMLESS MECHANICAL TUBING

A PRODUCT OF NATIONAL TUBE

UNITED STATES STEEL

it's only part of the HTM story...*

MACHINABILITY

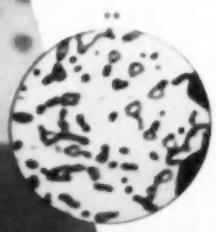


A low machinability index of only 80-90 (B1112 steel = 100) is often reason enough to specify HTM for your product.

But HTM castings don't stop there. Other "plus" advantages are high ultimate strength . . . resistance to wear under heavy loads and at high speeds . . . excellent non-seizing properties. In addition, they can be air or liquid quenched . . . can be smooth finished.

Don't overlook the many advantages of HTM metal. It can increase the performance and saleability of your product.

AA-3698

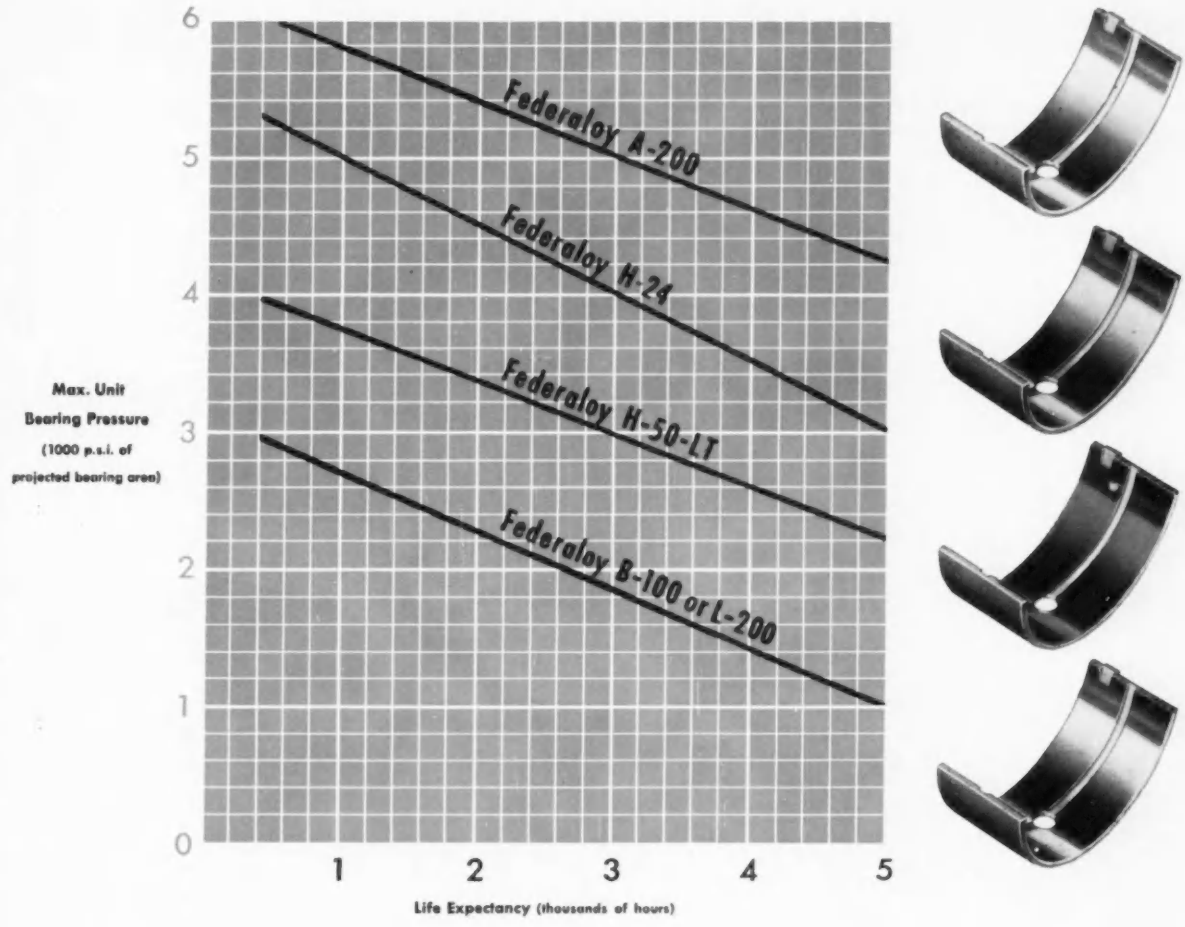


NATIONAL MALLEABLE AND STEEL CASTINGS COMPANY
Established 1868 • Cleveland 6, Ohio

The nation's largest independent producer of malleable and pearlitic malleable

*Hi-Tensile (Heat-Treated) Malleable

**HTM-228 metal, liquid quenched, x2000, etched



These alloy linings cover 95% of engine bearing requirements

With a steel back and one of these lining alloys—tin- or lead-base babbitt, medium or heavy-duty copper alloy—or extra heavy-duty aluminum alloy—95% of sleeve bearing requirements can be met with complete satisfaction in performance results.

Whether your bearing is a new design or re-design of an existing application, consultation with our Engineering Department may result in tooling advantages.

A FREE copy of "Automotive Sleeve Type Half Bearing" design guide will be sent on request.

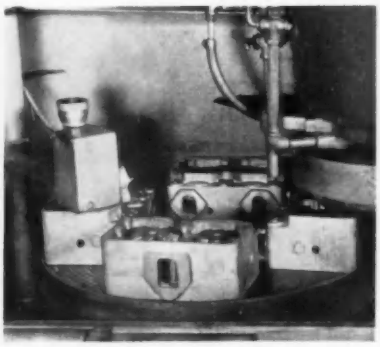
FEDERAL-MOGUL DIVISION

FEDERAL-MOGUL-BOWER BEARINGS, INC., 11037 SHOEMAKER, DETROIT 13, MICHIGAN

RESEARCH • DESIGN • METALLURGY • PRECISION MANUFACTURING

Whatever your grinding job may be...

200 adjusting screw washers are ground on one side in one hour. Stock removal .025"; limits ± .001".

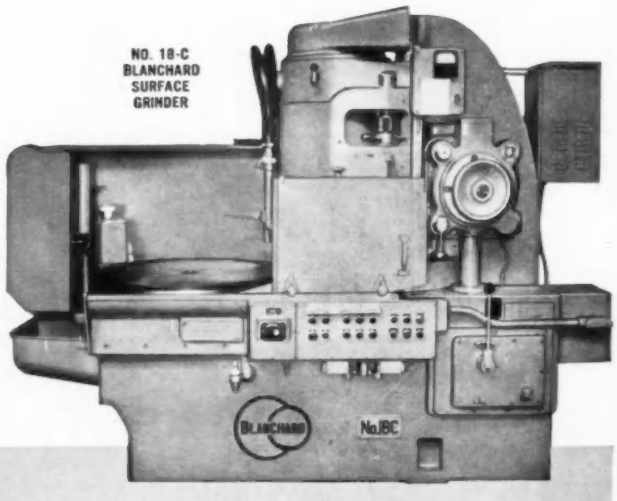


Tops of cylinder heads ground 21 per hour; stock removal 3/16" to 1/4". Bottoms 55 per hour; stock .012"; limits ± .001".

56 cast iron plates are ground on one side in one hour. Stock removal .140"; limits .001".

for best results...

The Blanchard No. 18-C Surface Grinder has the speed and precision that guarantees economical grinding on an endless variety of jobs. After the initial setup, the automatic cycle handles every operation from start to finish. The operator is freed to prepare the next load or to operate a second No. 18-C Grinder.



Put it on the Blanchard

The 18-C Automatic Cycle...

Moves chuck to grinding position and starts it rotating

Starts wheel rotation and coolant pump

Provides rapid wheel approach to work

Engages power down-feed at preset rate

Changes to fine feed just before finished size is reached

Stops feed when work is to size — "sparks" out. Raises wheelhead

Stops wheel, coolant pump, and chuck

Moves chuck to loading position — demagnetizes chuck

Can be changed quickly to manual operation

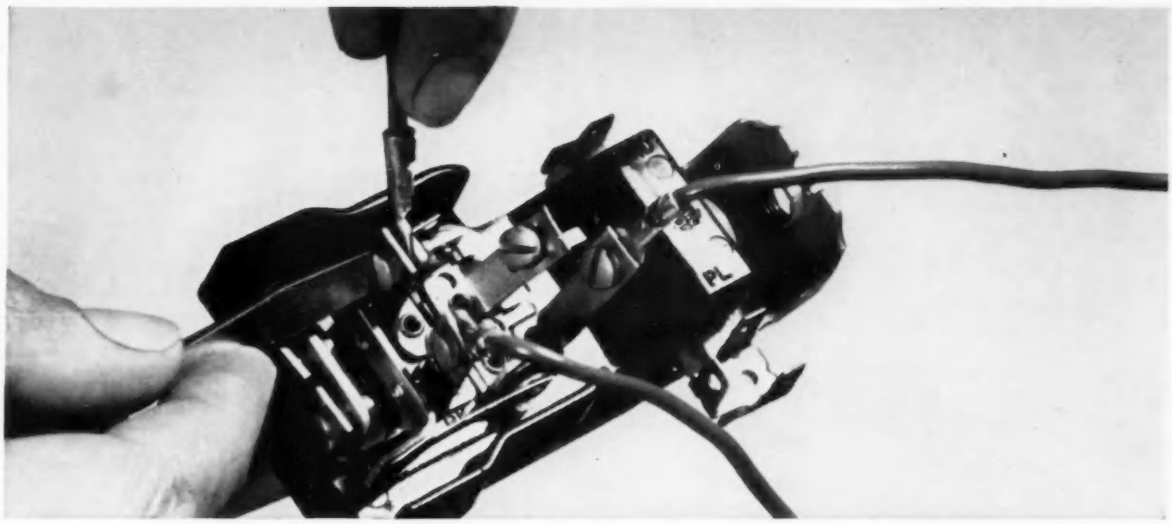
Automatically Controls Size!

Send today for your free copy of 18-C folder.

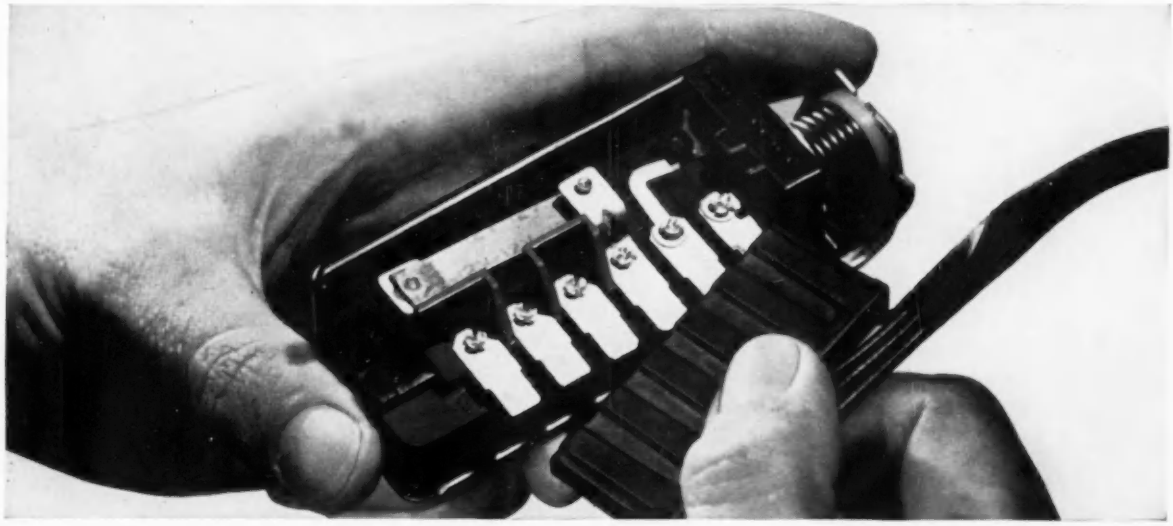
BLANCHARD

THE BLANCHARD MACHINE COMPANY

64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.



THINK / *of the effort here!*



CONSIDER / *the savings Packard makes possible.*

These self-insulating "Snap Fast" connector units simply snap together, simultaneously connecting two, three, five—up to eight different electrical circuits, *instantly*, without error or indecision. Automakers using this Packard Electric idea *save more than a million dollars per year in production costs!*

These connectors can't be installed improperly. And they won't shake loose. They effectively eliminate assembly line fires or other damage which result from incorrect single terminal installation.

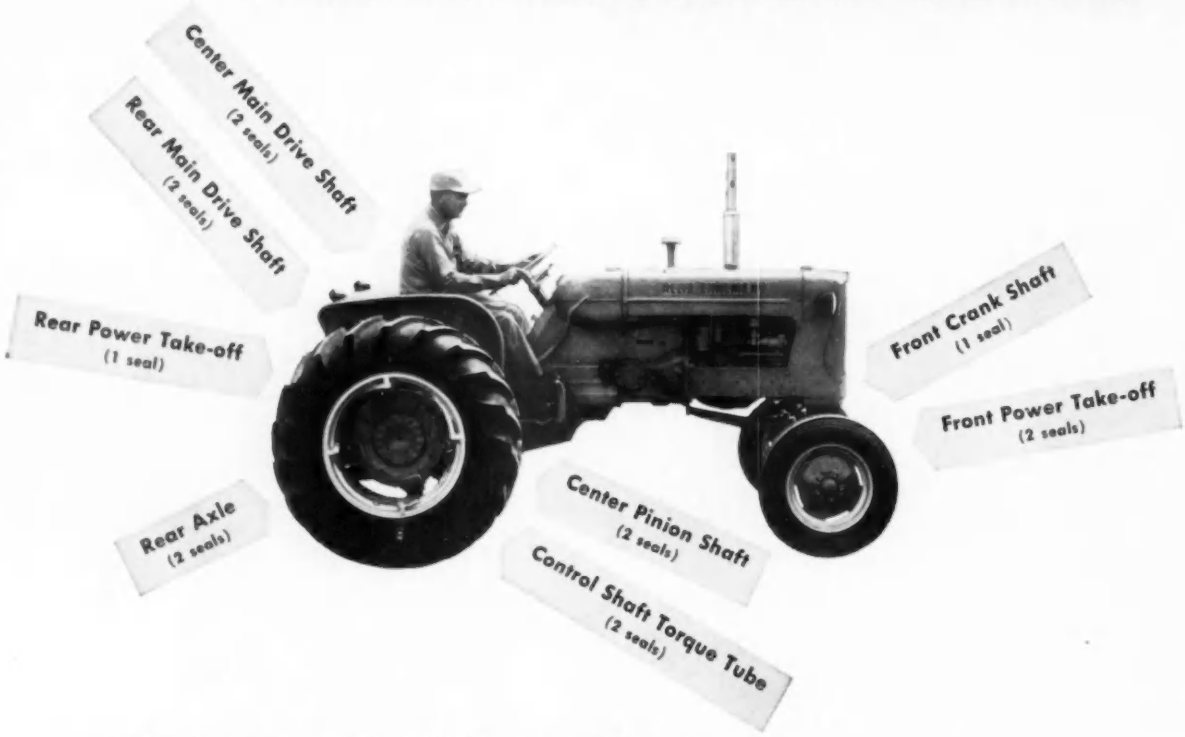
Packard Electric produces highest quality cable, complete wiring harnesses and new wiring ideas to help save you time, money and trouble. Packard Electric maintains offices in Detroit, Chicago and Oakland, California, for your convenience. If you are not already using Packard Electric wiring *know-how* to simplify your product and make it work better—now's the time to act.

Packard Electric

Warren, Ohio

"Live Wire" division of General Motors

NEW! LOOK AT THE 14 POINTS WHERE ALLIS-CHALMERS D-14 TRACTOR RELIES ON NATIONAL SEALS



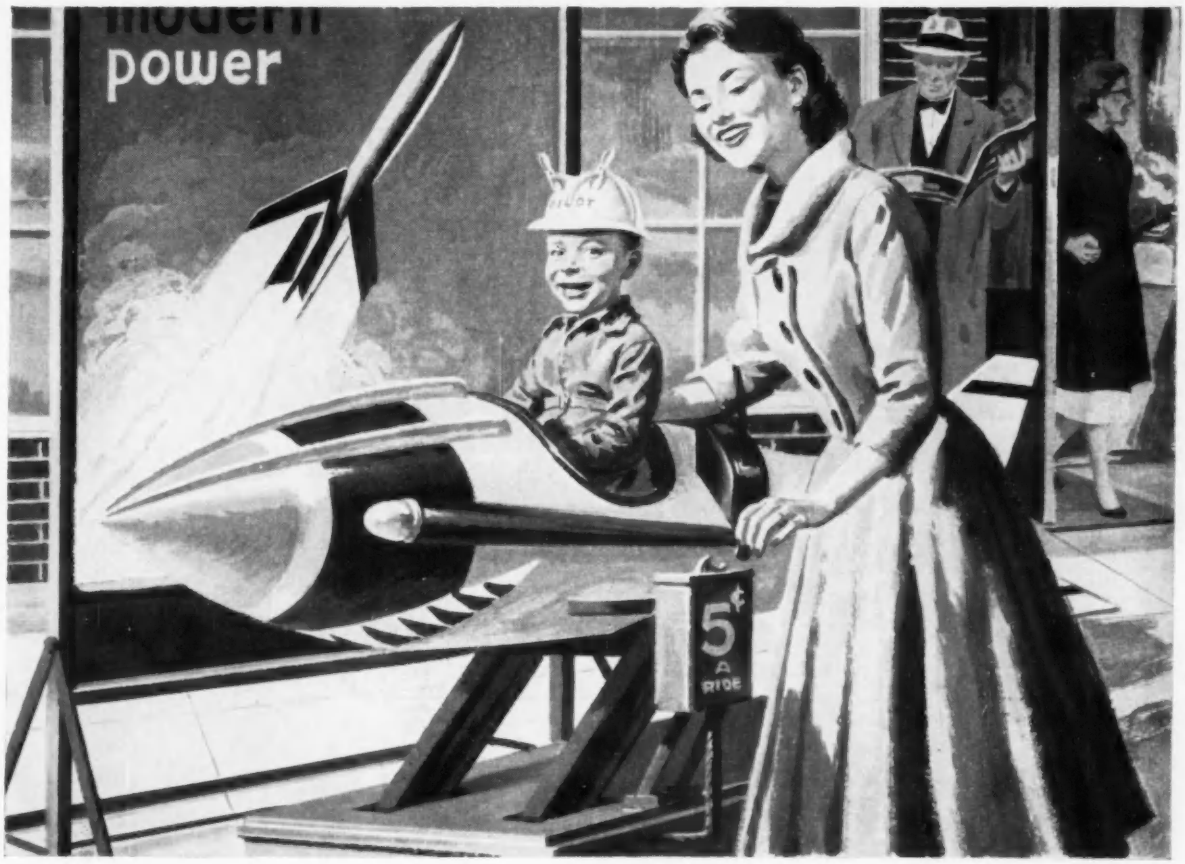
At 5 positions in the new D-14, Allis-Chalmers specifies steel-encased, spring-tensioned National leather oil seals. Two additional positions employ steel-encased, spring-tensioned Syntech® synthetic rubber seals. At still another position, the control shaft torque tube, a springless rubber-covered National Syntech is used.

All National seals in the D-14 (and many in Allis-Chalmers' equally new D-17 tractor) are standard design National seals. National supplies over 2,500 different types and sizes of oil seals, leather or synthetic. New seals are being designed daily to meet special applications.

For factual, professional engineering help on any shaft sealing problem, call your National Applications Engineer. He's listed in the Yellow Pages, under "Oil Seals—National Seal Division." He's backed up by 36 years of sealing experience, and the productive capacity of three modern plants.

NATIONAL SEAL Division, Federal-Mogul-Bower Bearings, Inc.

General Offices: Redwood City, California; Plants: Van Wert, Ohio, Downey and Redwood City, California



It Takes "A" Nickel to Make It Fly

Superior "A" nickel tubing with close tolerances and excellent properties helps today's rockets and missiles soar many miles out into the stratosphere

Superior "A" nickel tubing and many other components for these rockets and missiles are first tested extensively under the most demanding conditions engineers can devise. Tubing of "A" nickel has proved itself to have these important qualities:

- High corrosion resistance
- Strength retained at extremely high and low temperatures
- Ability to accept unusually severe fabrication
- Excellent heat transfer properties
- Unchanging properties during storage

Superior has long been one of the outstanding suppliers of aircraft quality tubing in a broad range of analyses, all produced to rigid specifications. Another example is Superior stainless hydraulic tubing, which is but one of our many tubing products being used by major aircraft manufacturers.

Make Superior *your* source of supply. We can furnish you with the finest quality small tubing obtainable anywhere. Our staff of engineers and specialists stands ready to work with you on any tubing problems of engineering or design.

For technical data on nickel and nickel alloy tubing, write us for Catalog 12. For latest information on stainless tubing, ask for Catalog Section 21. Superior Tube Company, 2020 Germantown Ave., Norristown, Pa.

Superior Tube

The big name in small tubing

NORRISTOWN, PA.

All analyses .010 in. to ⅝ in. OD—certain analyses in light walls up to 2½ in. OD

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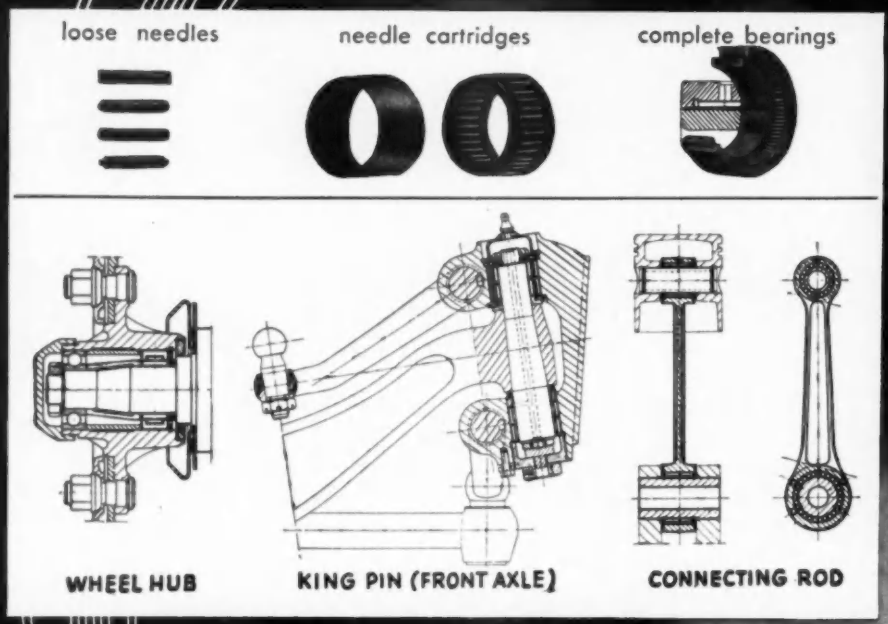
Oldest in age Still in the lead



NADELLA
NEEDLE BEARINGS

133 à 137 BOUL. NATIONAL - RUEIL-MALMAISON (S.-&-O.) FRANCE

ACTA

Want to SAVE up to 70% of heating costs on your phosphate coating line?

new Parker Cold Bonderite System does it!

Turn down the heat! Put most of your Bonderite line heat costs back in the till! Parker Rust Proof Company has developed a new Bonderite system for low temperature operation.

It includes a new cold alkaline cleaner that works beautifully at 70° and is effective in a temperature range from 60° to 120°. A new Spra-Bonderite, specially formulated to produce a superior coating at low temperatures, has been developed to work in conjunction with the new Parker cold cleaner.

With the new cold Bonderite system, savings are really sizable. Heat consumption in the line is cut by as much as 70%. Cost of the new Parker system is approximately equal to conventional alkali cleaners and phosphate coating chemicals, so the savings in heat are practically all velvet. It is estimated that on an average automobile body line the savings in steam costs can run as high as 10 to 12 cents per body; on an average refrigerator line 4 to 5 cents per cabinet. Savings in B.T.U.s can mean savings in dollars.

The new cold Bonderite system has been production-tested in mass production plants. Its performance has amazed the experts. It's ready to go to work in your plant, saving you money, right now!

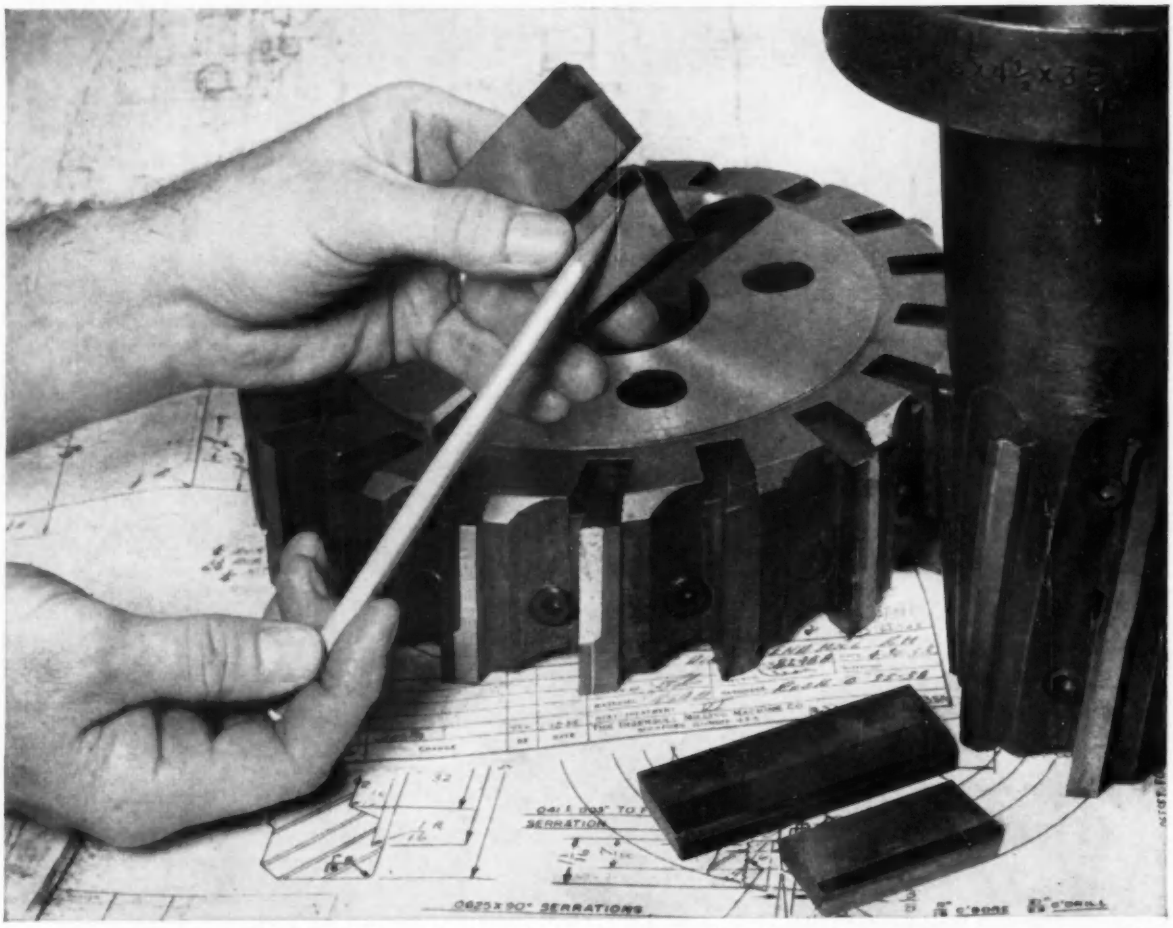
Why go on paying for heat you don't need? Start using Parker's new cold Bonderite system. A letter or phone call will bring a Parker man with full, money-saving details.

*Bonderite, Bonderlube, Parco, Parco Lubrite—Reg. U.S. Pat. Off.

PARKER RUST PROOF COMPANY
2178 E. MILWAUKEE, DETROIT 11, MICHIGAN

Since 1914—leader in the field

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883



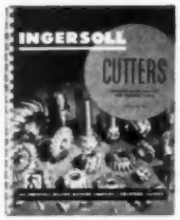
Ingersoll Type "NX" inserted blade Face Mills . . . for milling shoulders in steel or cast iron. Tips can be furnished any length to suit workpiece.

Worn Blades Are Only One Part Of Your Tool Costs

The initial price of the blades and the number of pieces produced between grinds, the design of the cutter and economical arrangement of the tip are all important considerations. Ingersoll's cutter service also includes a study of the machine, metal, speed, feed, rate of production and finish requirements. Only after considering all these can we recommend a cutter which will do your particular job best at the lowest cost.

We are used to working with these variables and offer you helpful counseling service as well as a proven line of cutters. Our job is to help you reduce your milling and boring costs, not just once but continuously.

We will welcome an opportunity to tell you more about this service. Write:



If you do not have a copy of this book, write us and we will send you one. It describes in detail the complete line of Ingersoll inserted blade milling and boring tools. Ask for Catalog #661

CUTTER DIVISION

THE INGERSOLL MILLING MACHINE COMPANY

505 FULTON AVENUE — ROCKFORD, ILLINOIS

Resistance Welding Jet Engine Parts

SCIAKY

HELPS PUT PROFIT
INTO MANUFACTURING

Heintz Achieves Volume Production with New Sciaky Counter Control Welders

In fabricating and job shops, where a wide variety of assemblies must be welded to rigid specifications every day, Sciaky resistance welding helps keep production schedules *on schedule*.

The Jet Engine Division of the Heintz Division, Kelsey-Hayes Company, a large Philadelphia contract fabricator, manufactures original and replacement parts for the aircraft industry. This means their production must meet exacting jet engine specifications.

New Sciaky Counter Control

To help meet these requirements, Heintz now uses Sciaky Patented Three-Phase Resistance Welders with the new Predetermined Electronic Counter Control. This new unit provides precise control of all welder functions for absolute production consistency. All control settings are realized with extreme accuracy, and are readily reproduced at any time to duplicate previous production runs. The machine cannot deviate from its setting.

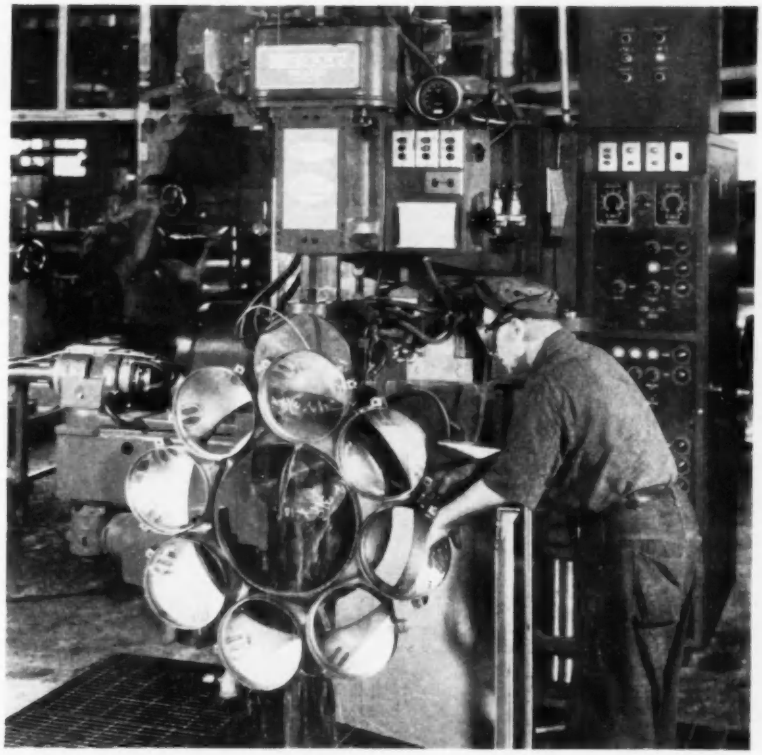


Fig. 2 Seam welding stainless to stainless on Pratt & Whitney Aircraft J-57 jet engine transition duct assembly. Note simple fixture used.

Fig. 1 Seam welding Nimonic to Nimonic on Pratt & Whitney Aircraft J-57 afterburner diffuser section.

The Sciaky Predetermined Electronic Counter Weld Control is the only control of this type that has been proved in service, and the first unit of this kind has now been in use nearly two years.

How It Works

The Sciaky Predetermined Electronic Counter Control counts the cycles of power line frequency which is governed by the U.S. Naval Observatory. In predetermined absolute numbers, cycles and impulses are simply counted by a Dekatron tube to control the duration of the various welder functions. The absolute consistency of the control eliminates the need for time-consuming periodical check-out or calibration. Plug-in feature permits easy unit replacement, or addition of other control functions if required.

Operations Performed

Photos show typical Sciaky resistance welding applications on jet engine parts—Afterburners, Screech Screens, Engine Duct Assemblies, etc. Materials welded include Nickel Alloy, Nimonic and Stainless Steel.

Information Available

Case histories outlining the successful use of Sciaky Resistance Welding Techniques on jet engine components are available on request. Specific recommendations will be furnished on receipt of an outline of your requirements.

Write today, mentioning the information you would like to receive. There is no obligation. Sciaky Bros., Inc., 4925 W. 67th St., Chicago 38, Ill. POrtsmouth 7-5600. 62-C

ONLY Eastman

CAN GIVE YOU THIS COMBINATION . . .

EXCLUSIVE EASTMAN PACKAGE

1 ***Exclusive*** **Eastman Inter-Lock® Clamp for Best Hose Connection.**

Exclusive grip advantages offered in no other clamp. Accurate machining assures positive positioning. Hose is uniformly compressed between insert and clamp without pinching or weakening, creating Eastman's exclusive "Inter-Lock" grip.

2 **Eastman Split Flange for Tighter Seal at Higher Pressures.**

Cuts production and replacement costs with a No-Thread, No-Leak "O" Ring Connection which eliminates tapered threads, sealing compounds and spiral leaks—as well as housing distortion.

Only Eastman can give you this Split Flange Clamp and exclusive Inter-Lock Coupling Combination. *Only* when you specify Eastman can you get the advantages of both. *Only* Eastman can give you this convenient one-source package.

This combination is ideal for *Original* heavy duty equipment. It is the only answer to high pressure requirements because it meets highest OEM specifications and easy field replacement needs.

Available with stem inserts in angles from 0° thru 90°, sizes from ¼" thru 2", recommended pressures from 375 p.s.i. to 5000 p.s.i.

Look to Eastman . . . America's No. 1 OEM specification . . . for all your fluid power line requirements . . . for the best assembly, the best performance, the best service. Eastman is also recognized for its leadership in engineering design and development . . . backed by unequalled years of experience in the field. *It pays to submit your original specifications for your first quotation to Eastman!*

EASTMAN SPLIT FLANGE

Eastman offers you the famous patented split flange design which assures a tilt and blowout proof clamp. "The higher the pressure the tighter the 'O' Ring seal."

Eastman "O" Ring Boss Fittings

Now available with new "Back-up" washer and locknut eliminating "O" Ring extrusion per SAE specifications.

Eastman
first in the field

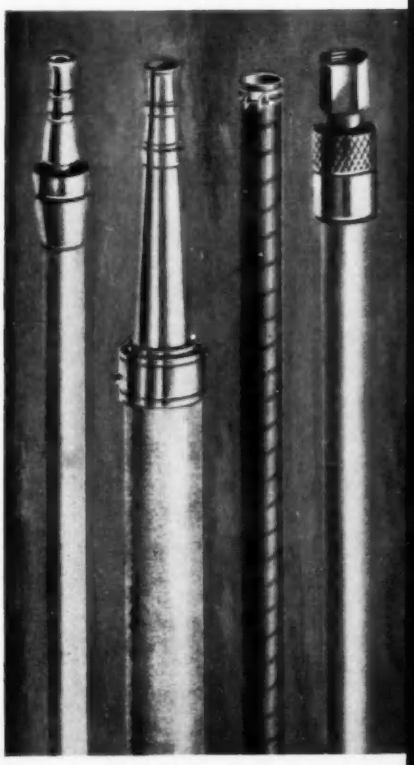
Manufacturing Company
Dept. AI-1
Manitowoc, Wis.

DESIGN AND DEVELOPMENT ENGINEERS:

Write for Technical Bulletin 200 for Information and Specifications on Complete Eastman Line of Hydraulic Hose Assemblies, and Bulletin 40 on Inter-Lock clamp.

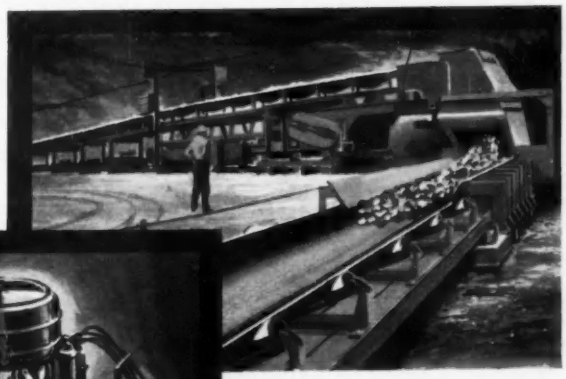
FORTISAN-36

STRONGER THAN EVER



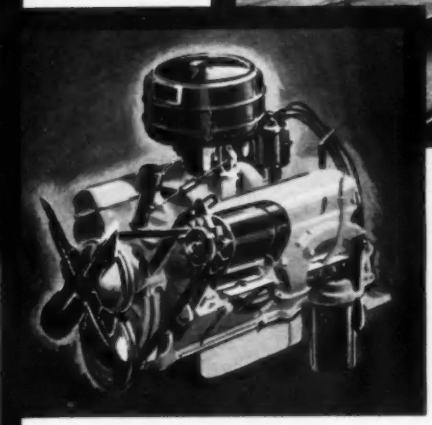
IN HOSES

Fortisan-36 is at its best when the pressure is on, providing tremendous tensile strength at light weight to fire, fuel, knitted radiator hoses and many more.



IN CONVEYOR BELTS

Resistant to temperature changes, dimensionally stable through all weather, neither sagging nor stretching despite long pitches, Fortisan-36 delivers the goods!



IN V-BELTS

From industrial to automotive end-uses, Fortisan-36 as reinforcing yarn provides strength and *stability*.

FORTISAN-36 is going stronger than ever in mechanical rubber goods. And for the best reasons. This specially engineered Celanese fiber doesn't shirk work. It has tremendous tensile strength at light weight. Singular dimensional stability through load, temperature and moisture changes. And Celanese not only delivers its fabrics but its technical knowledge as well. Celanese Corporation of America, Sales Development Department, Textile Division, Charlotte, N. C.

District Sales Offices:
180 Madison Ave., New York 16, N. Y. • Room 10-141 Merchandise Mart, Chicago 54, Illinois • P. O. Box 1414, Charlotte 1, N. C. • 200 Boylston Street, Chestnut Hill 67, Mass. • 819 Santee Street, Los Angeles, Cal.

Export:
Amcel Co., Inc. and Pan Amcel Co., Inc., 180 Madison Ave., New York 16, N. Y.

In Canada:
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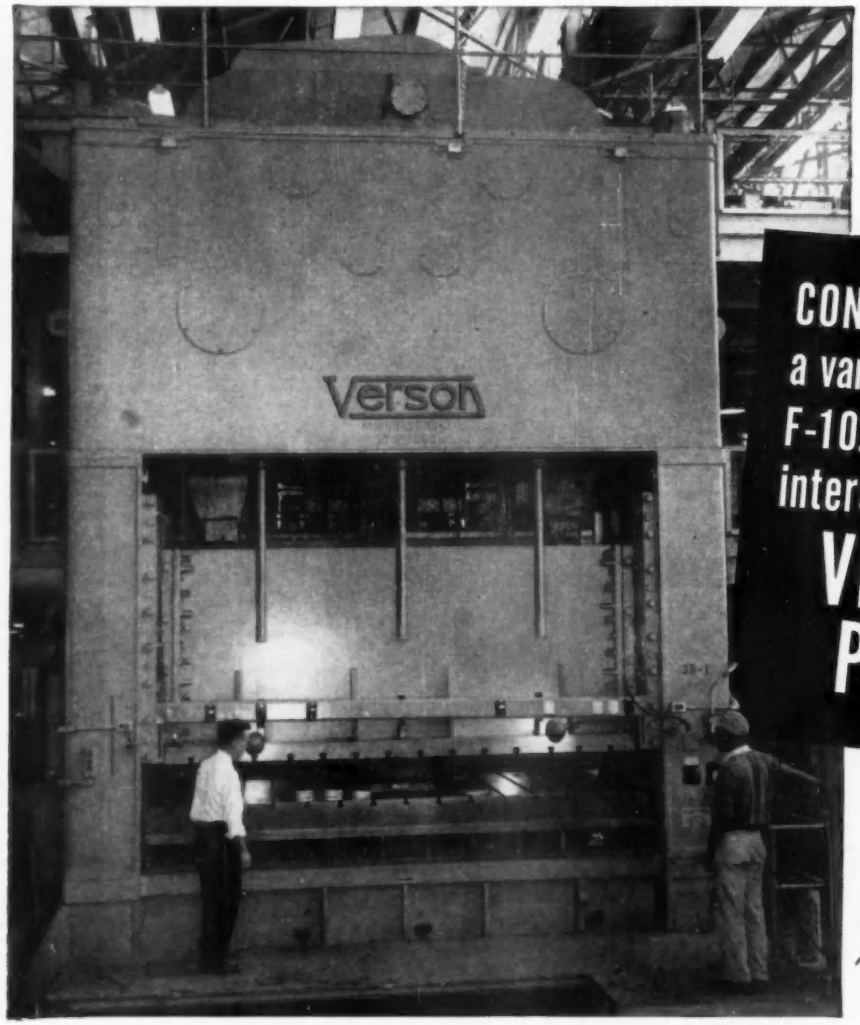
Celanese®

Celanese Fibers for Industry

FORTISAN® RAYON • FORTISAN®-36 RAYON • ARNEL® TRIACETATE • RESILUCEL™ • ACETATE • VISCOSE RAYON



CONVAIR produces a variety of parts for F-102A and F-106A interceptors on this VERSON PRESS

At Convair's San Diego Plant II, this 1000 ton Verson Eccentric Press proves its versatility daily by blanking and forming a variety of sheetmetal parts for Convair's F-102A and F-106A interceptors.

Blanking operations can utilize the full bed-size of 68" x 156" and the press has a drawing capacity of 8". One method in the blanking operation employs a "Standard Master Die Set," wherein inexpensive "pancake" type dies are drilled in a master drill jig to provide the attach holes for the master die set. Another method uses large blanking dies, designed and built with self contained guide pins and bushings.

After nearly three years use, detailed records show only a bare minimum of maintenance. Service such as this has gained for Verson, a reputation throughout industry as a builder of fine presses, outstanding in their versatility.

You can achieve greater efficiency and lower costs by taking advantage of Verson's unexcelled know-how. Let us make specific recommendations from an outline of your requirements. Write or phone, today.

A Verson Press for every job from 60 tons up.

Verson

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9307 S. KENWOOD AVENUE, CHICAGO 19, ILLINOIS • 8300 S. CENTRAL EXPRESSWAY, DALLAS, TEXAS

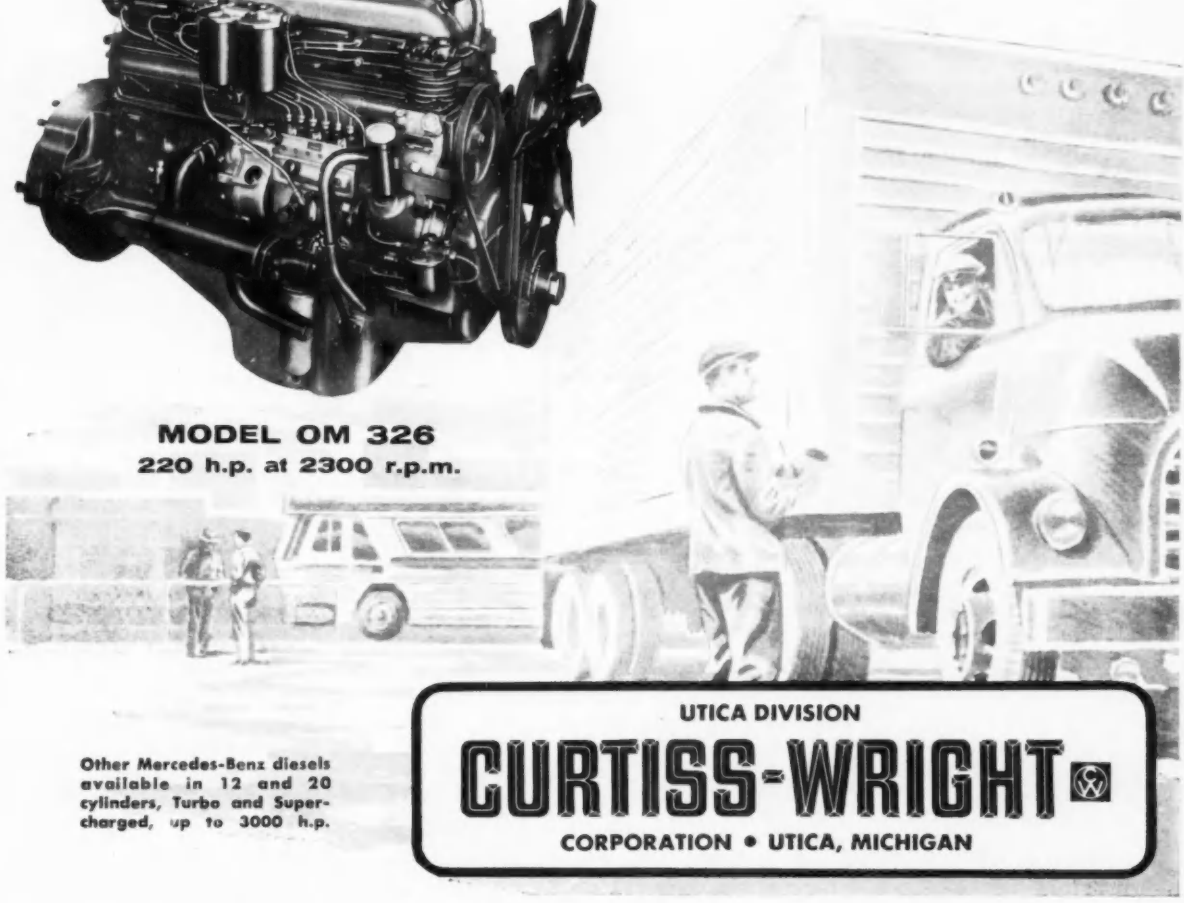
MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

COMPLETE DEPENDABILITY with LOWER MILEAGE COSTS!

MERCEDES-BENZ
DIESEL ENGINES

Keeping them rolling at the lowest possible cost is of vital importance to the trucking industry . . . And just as important as economy is to management, the power under the hood is to the driver . . . With Mercedes-Benz diesel engines you get economical fuel consumption, simple maintenance, quiet operation and smokeless combustion . . . When the driver needs that added surge of power, he gets it with a Mercedes-Benz diesel . . . The effortless performance of the world famous Mercedes-Benz diesel engine, and its unusually long life, make it the finest engine available for owners who demand the very best.

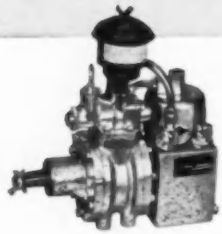
MODEL OM 326
220 h.p. at 2300 r.p.m.



Other Mercedes-Benz diesels available in 12 and 20 cylinders, Turbo and Supercharged, up to 3000 h.p.

UTICA DIVISION
CURTISS-WRIGHT
CORPORATION • UTICA, MICHIGAN

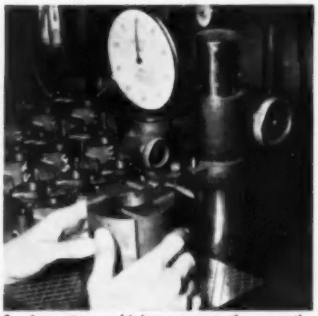
Rigid quality control
in manufacturing the Wagner ROTARY AIR COMPRESSOR and other air brake components improves operating efficiency and service life



The superior operating features of Wagner Rotary Air Compressors are directly related to Wagner's Rigid Quality Control manufacturing program—an important reason owners have so little trouble when the compressors are put into operation. At the factory every unit must pass careful inspection and run-in tests to assure that each compressor provides an adequate supply of air pressure at all times, with fast air recovery; and can provide safe, dependable performance and long service life.

If service should be needed—the entire compressor can be completely disassembled, serviced and put back into operation in a few hours. There are Wagner factory service branches in 23 major cities and a vast network of Wagner Air Brake Distributors throughout the United States and Canada to give prompt and efficient service on any air brake need.

It will pay you to include Wagner Air Brake Systems as standard equipment on the vehicles you manufacture. For further information, send for a copy of Bulletin KU-201.



1. Accurate machining assures the smooth, cool operation of the Wagner Rotary Air Compressor. Close dimensions on all planes of the rotor eliminate vibration . . . permit compressor blades to function smoothly at high speeds.

2. Accurate machining and gauge testing of the stator, as well as the rotor, also contributes to the rotary compressor's ability to operate for long periods of time without delevoping leaks or losing efficiency.

3. Compressor shafts are given the "cold box" treatment. When exposed to very low temperatures, the shaft diameter contracts. This altered shaft diameter allows proper insertion into a heated rotor to form a strong, composite unit.

4. Compressor rotors are subjected to high oven temperatures to expand rotor diameters. Shafts and rotors joined together under these extreme conditions resume their original relative size to create an extra strong assembly.

5. Assembled rotary compressors are hooked up to air lines and operating air pressure is applied for leakage tests. While holding pressure, entire compressor is submerged to determine whether any air is escaping.

6. Every Wagner Rotary Air Compressor is given a rigorous "run-in" test to determine its resistance to overheating and its over-all performance. Running temperatures, vibration, noise and air output are carefully noted and analyzed.

WK58-1A

Wagner Electric Corporation
6363 PLYMOUTH AVENUE, ST. LOUIS 14, MO., U. S. A.
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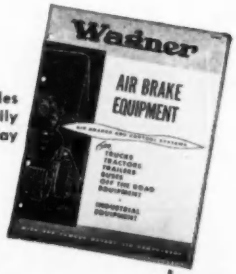

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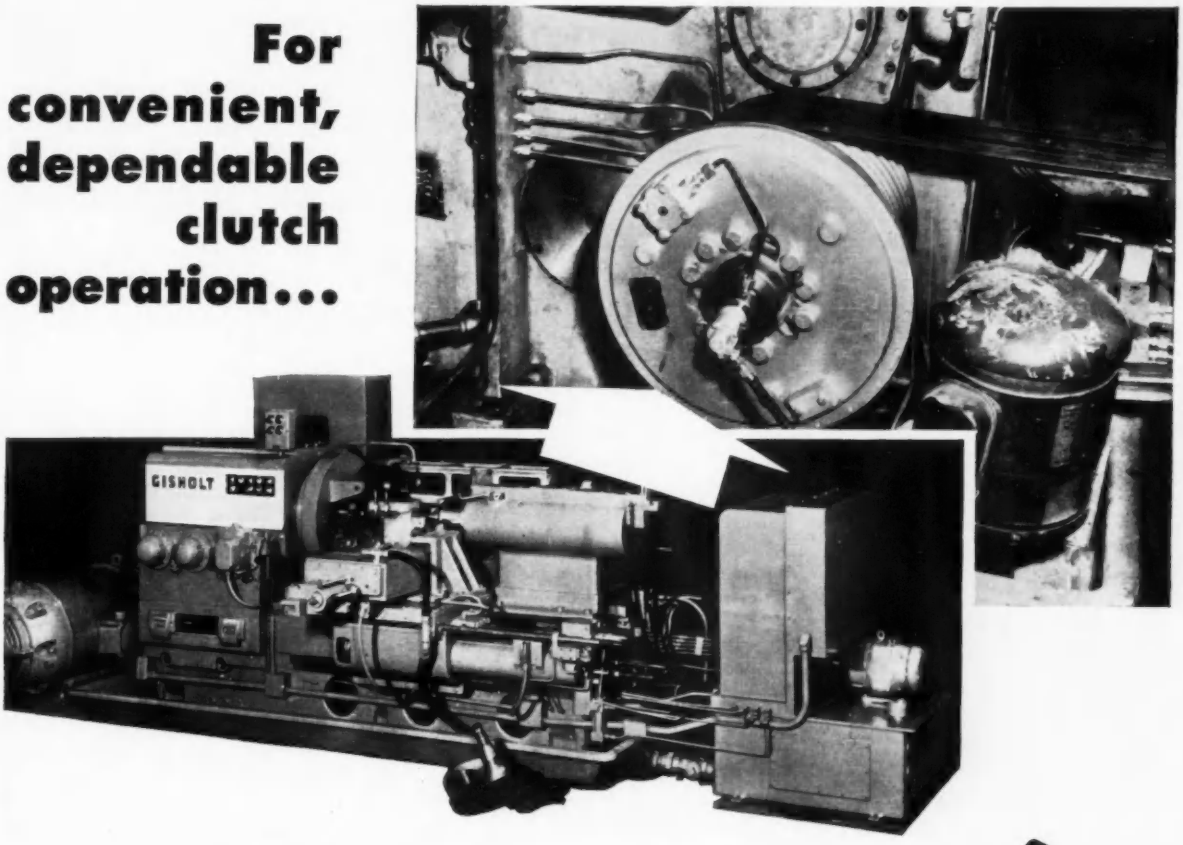

...the swing is to AIR!

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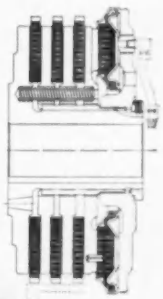

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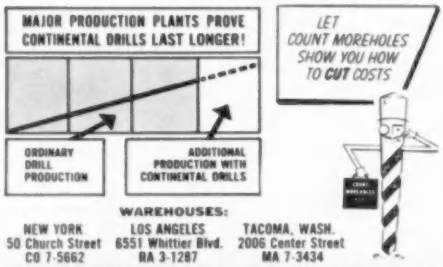
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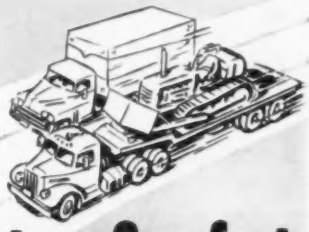

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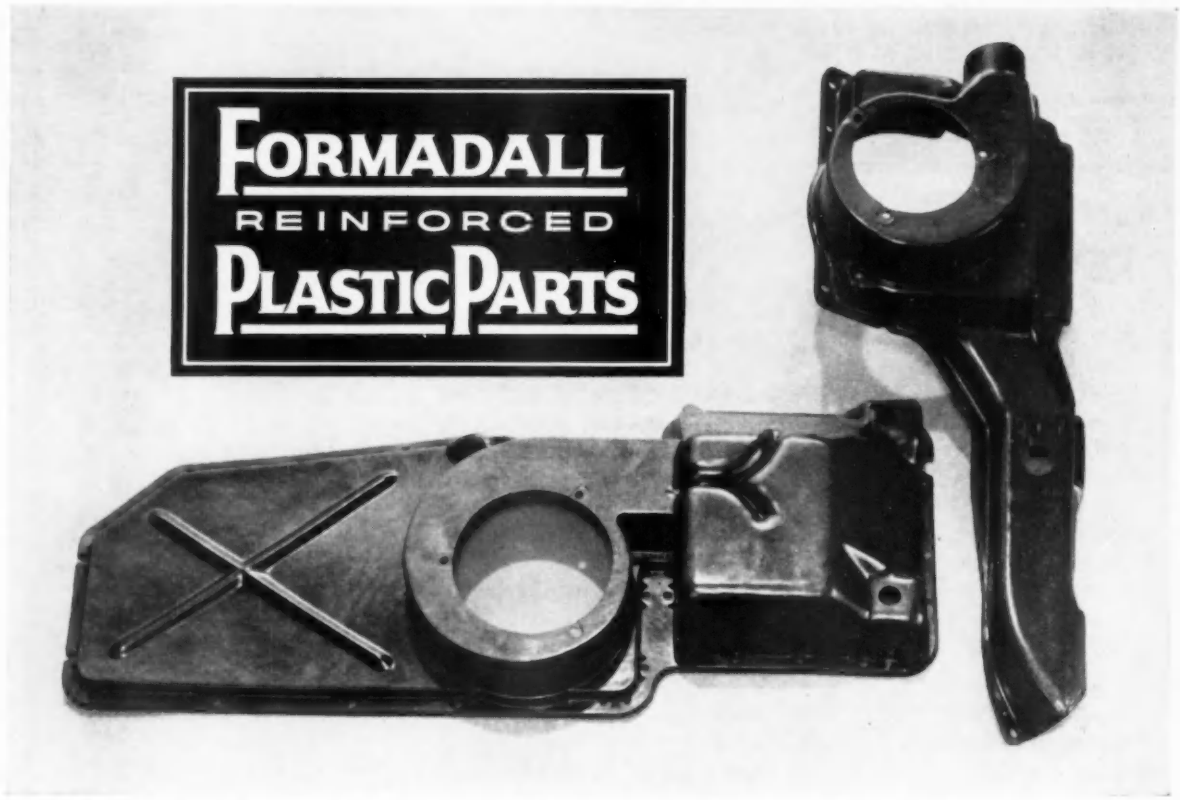

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2 Large Plastic Moldings Replace 15 Major Stampings and Countless Minor Parts

A new basic material shaped to your specifications to eliminate problems of metal fabrication

The original design for the heater-defroster unit shown above was a spot-welded steel assembly which required 15 major stampings and dozens of minor parts. The problems in sealing and in assembly of the original design were obvious, and labor costs were excessive.

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Pioneering successful *new* materials and *new* engineering applications such as this, has been a Woodall habit for over 38 years. Why not put this extensive product development and engineering experience to work for you . . . today?

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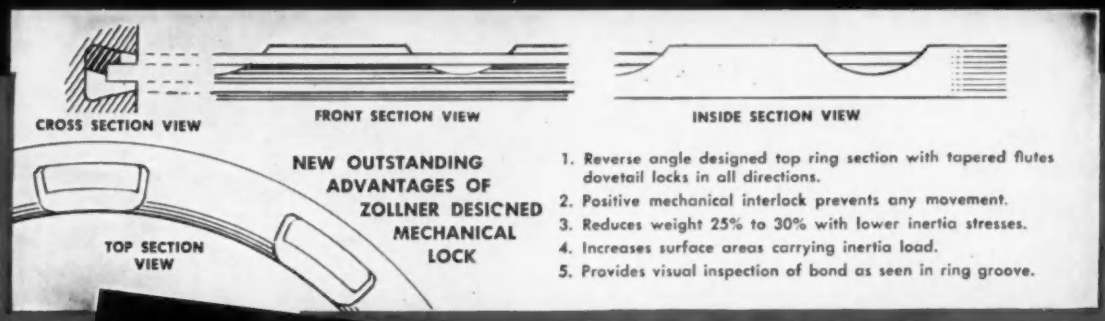
BOND-O-LOC* PISTONS

WITH "NI-RESIST" IRON TOP RING SECTION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FRONT SECTION VIEW
INSIDE SECTION VIEW
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NEW OUTSTANDING ADVANTAGES OF ZOLLNER DESIGNED MECHANICAL LOCK

1. Reverse angle designed top ring section with tapered flutes dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.
5. Provides visual inspection of bond as seen in ring groove.

Double Bonded
METALLURGICALLY Al-Fin Bond
MECHANICALLY Zollner Lock

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RING GROOVE WEAR IN HEAVY DUTY SERVICE

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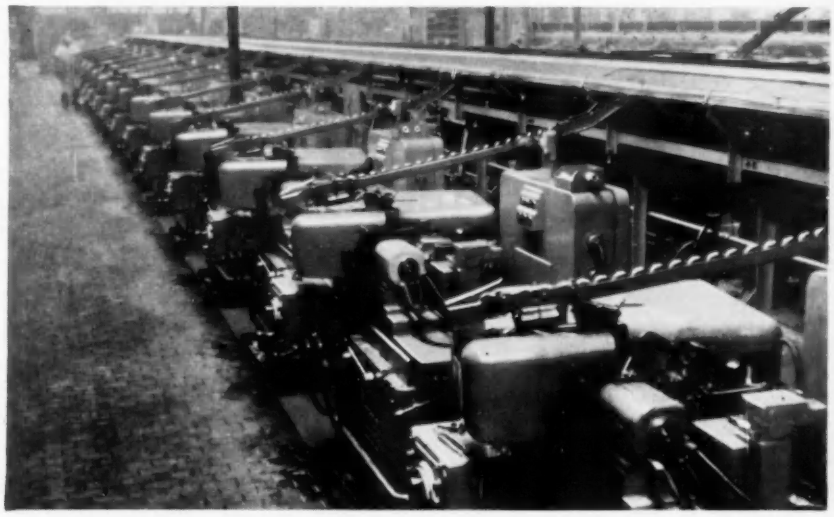
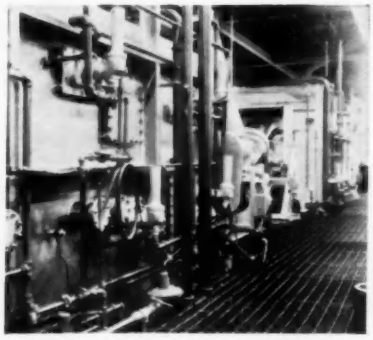
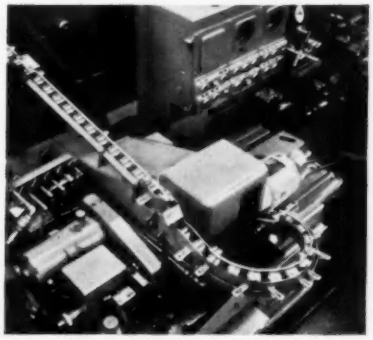


1. Here's where the Timken® tapered roller bearings are made that have saved auto makers big money—kept their bearing costs down in the face of rising costs. And the revolutionary high-speed production techniques used in Bucyrus promise to keep costs down with further standardization on Moto-Mated bearing sizes.

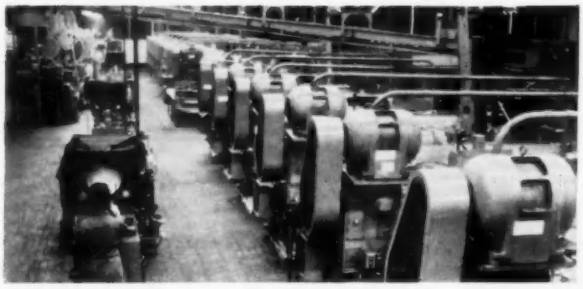


2. Mated to auto industry's needs. The new Timken Moto-Mated bearings are completely redesigned to meet the big change in cars.

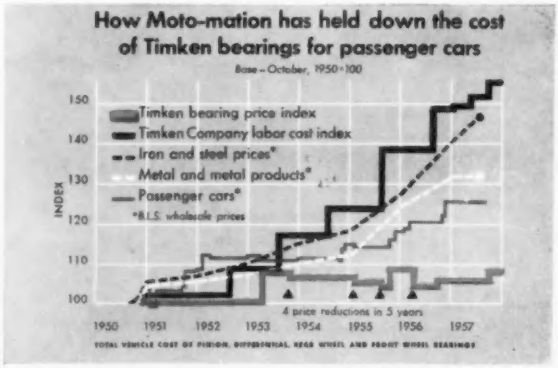


3. Auto makers saved automatically when they switched to the new Moto-Mated bearing sizes. Saved in related parts too.

4. The more bearings we produce in our Moto-Mated plant, the more production economies we can pass on to you.



5. Standardization breeds savings. You can see in the graph (right) how Timken Moto-Mated bearings have held the line against the automotive industry's rising costs. Standardization on fewer sizes and longer production runs have made this possible. Call your local Timken bearing engineer and let him help you redesign your bearing applications. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".



Meeting the big change in cars with the big change in bearings

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